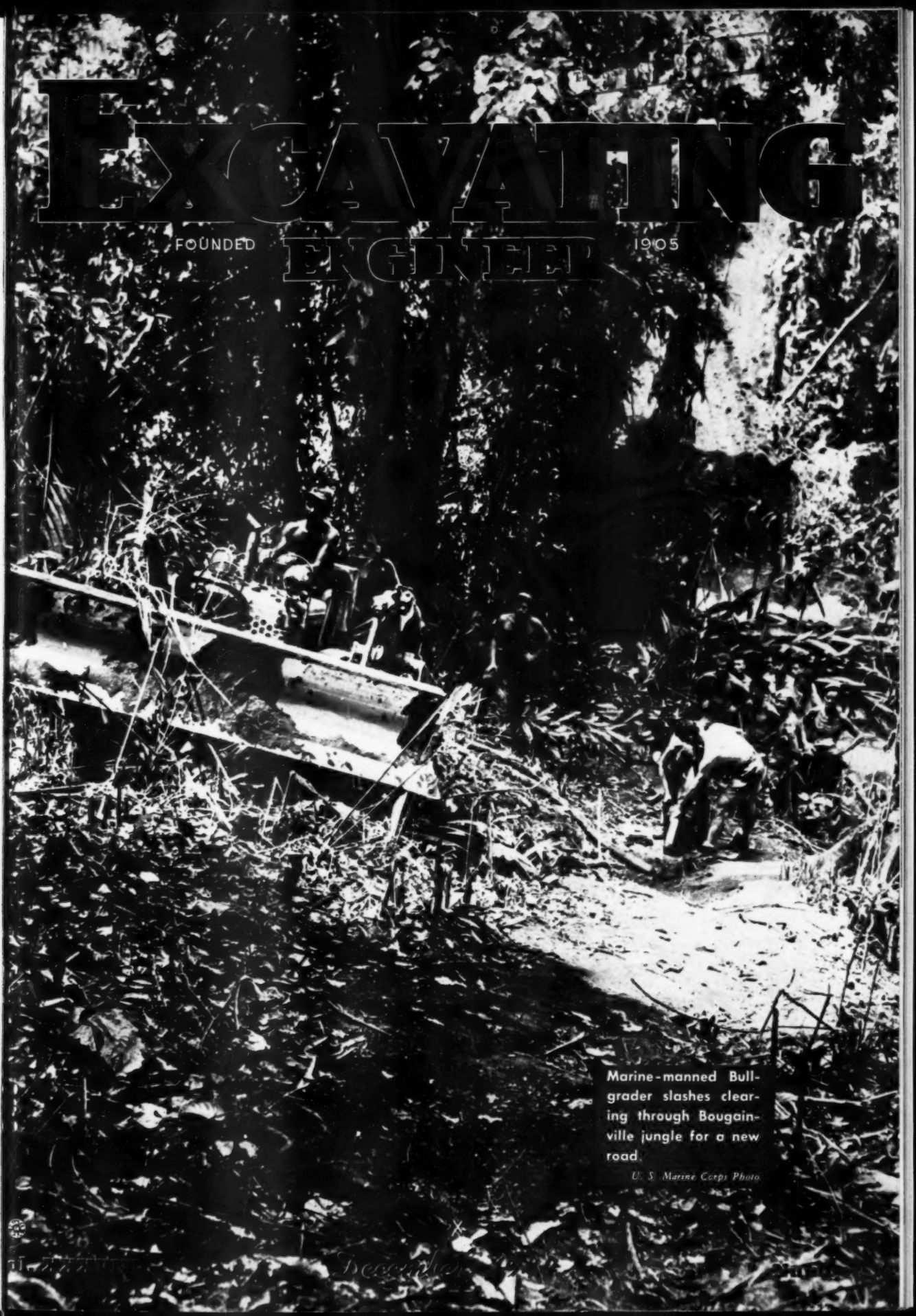
EXCAVATING ENGINEER

FOUNDED 1905



Marine-manned Bull-grader slashes clearing through Bougainville jungle for a new road.

U. S. Marine Corps Photo

December

The SPECIFICATIONS *are Yours!*

Your requirements for profitable dredging determine the design of the Bucyrus-Erie hydraulic dredge you get. Our engineers work with yours to give you a truly job-tailored unit incorporating the features of design, construction, materials that will bring you the most in output and profits. In more than 60 years of building job-fitted dredges which have moved billions of yards, Bucyrus-Erie's unparalleled experience guarantees that your dredge will be "years ahead," the best obtainable for your work.

Your needs are our command — that's the policy which every Bucyrus-Erie machine, whether dredge or dry land excavator, reflects. That's why you'll profit most with Bucyrus-Eries.

E-20C

Dredges — Shovels — Draglines — Cranes — Drills — Tractor Equipment

ARMY E NAVY

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

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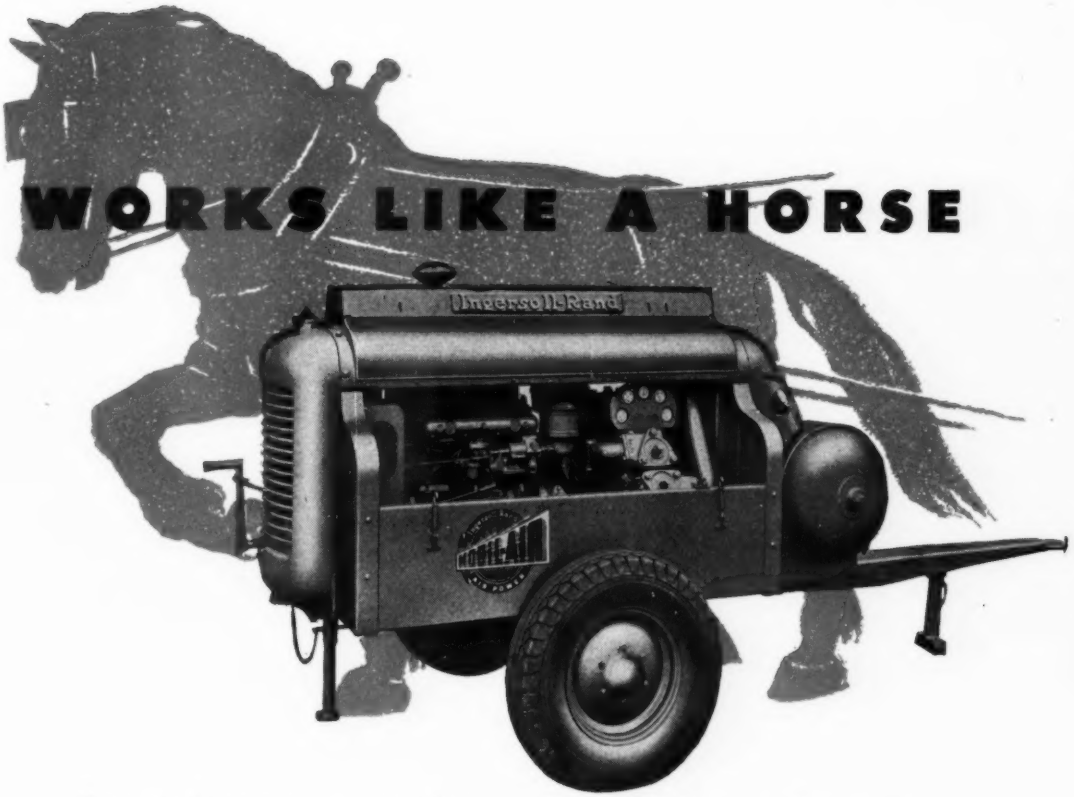

. . . but knows when to take it easy

INGERSOLL-RAND portable air compressors have always been work horses, but the present K-Series MOBIL-AIR units are far superior to any portables we have ever produced. They purr right along at full load without any fuss, and can keep right on doing it "around the clock."

But MOBIL-AIR compressors know enough to slow down and work at a slower speed whenever full output is not required. Their *capacity-control* practically eliminates wasteful idling. The average working speed of the engine and compressor is slower and more efficient. On an average job, the fuel savings at full load, plus those due to the slower speeds at part capacity, result in over-all savings up to 40% in vital gasoline. Wear and tear is reduced, and the machines last longer.

This *capacity-control* is accomplished by the Drill-More Multi-Speed Regulator, pioneered and introduced by Ingersoll-Rand in 1939. MOBIL-AIR compressors have other equally important features, too. Be sure your next portable is a MOBIL-AIR.

Ingersoll-Rand also makes the tools that use the air.

Ingersoll-Rand
11 BROADWAY, NEW YORK 4, N. Y.

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COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • OIL AND GAS ENGINES

Heavy hauls really ROLL on this TIME-PROVED TOUGHER TREAD

GOODYEAR
ALL-WEATHER EAR
MOVERS keep this LaPla
Choate CARRIMOR wor
fully up to its name.

MORE AND MORE contractors now buy Goodyear All-Weather Earth-Movers for drawn units because they know that this great work tire gives them maximum flotation — keeps their *heaviest* loads moving free and fast.

That's because the rugged, job-proved All-Weather tread of this BIGGER tire extends over the shoulders *to the center of the sidewalls* —provides side traction, prevents side slip on grades.

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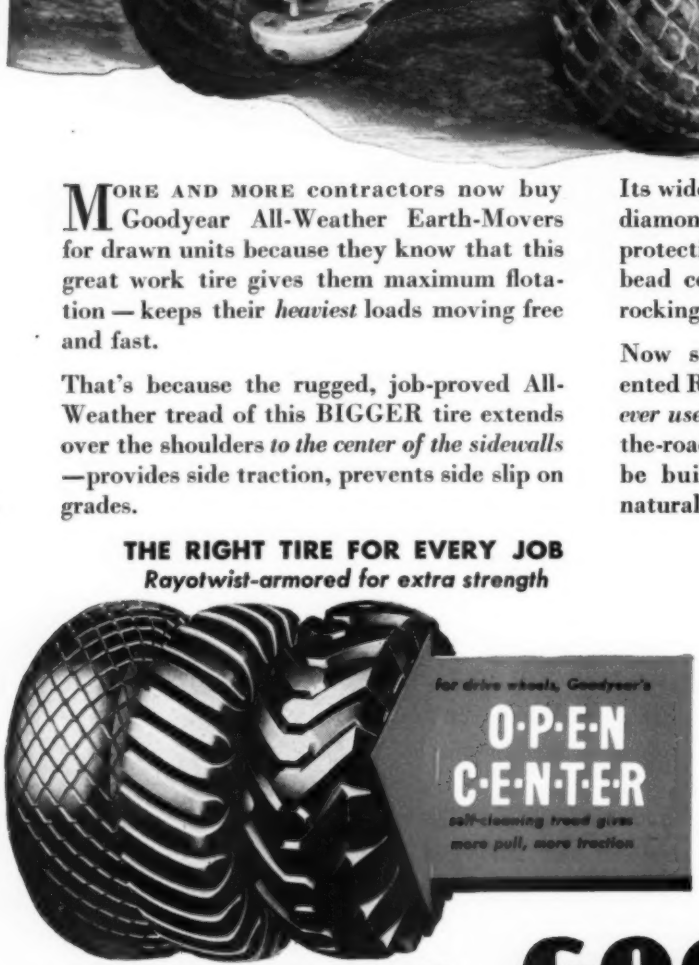
Now super-armored with Goodyear's patented Rayotwist cord—*the strongest body we've ever used in a work tire*—these Goodyear off-the-road giants are by far the finest that can be built from synthetic and permissible natural rubber available today. They deliver more ton-miles of heavy-duty service because they are the longest-lasting, hardest-working tires available.

For proof of that, talk to the men now using them. Once you do, you will want Goodyears on all your units.

BUY WAR BONDS—BUY FOR KEEPS

THE RIGHT TIRE FOR EVERY JOB
Rayotwist-armored for extra strength



ALL-WEATHER EARTH-MOVER for drawn vehicles
HARD ROCK LUG for all rock work
SURE-GRIP for drive wheels

PRODUCTS OF GOODYEAR RESEARCH

All-Weather, Rayotwist, Sure-Grip—
T.M.'s The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

EXCAVATING ENGINEER

FOUNDED 1905

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Published Monthly by
THE EXCAVATING ENGINEER PUBLISHING COMPANY
South Milwaukee, Wisconsin, U. S. A.

F. O. WYSE, Publisher — J. D. GRACE, Editor
D. B. REED, JR., Managing Editor — E. W. ARNDT, Art Editor
E. M. HEUSTON, Sales Manager

CCA Member Controlled Circulation Audit

Regular Subscription (payable in advance): 25 cents per copy, $2.50 a year: Canada and foreign, subject to publication policy, $3.50 per year. Special subscription: Upon written request on company letterhead this publication will be sent (not regularly) free of charge to companies, executives and supervisors engaged actively in excavating.

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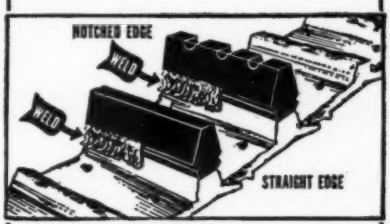
It's easier to lift, lower, push or pull the Simplex Way!

Simplex LEVER · SCREW · HYDRAULIC **Jacks**

for every construction purpose
Awarded the Gold Medal for Safety
Ask for Catalog 44
Templeton, Kenly & Co., Chicago 44, Ill.

Write that Letter to a Serviceman Today!

Rebuild your TRACTOR GROUSERS WITH BULLDOG *Grip-Lugs*



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Other Products
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Mango Bars for Repointing
Digger Teeth
Excelloy Overlay Metal

Send for Folder EE5

ALLIED STEEL PRODUCTS Inc.
N. B. C. Bldg.
CLEVELAND 14, OHIO

DON'T LOOK NOW!

...but one day soon this will be a safe, new U.S. Highway

THIS IS no road for your car now. It's a picture of a highway coming up. But it is also part of one of the greatest plans for American security and prosperity in the post-war years to come.

Road building is tremendous enterprise. Today, in the planning stage, it looks like jobs for seven million men and investment of billions a year—a big factor in the nation's basic economy.

New roads are needed—*now*. Before the war our great highway system carried traffic estimated in 1941 at 300 billion miles—about all the old roads could carry. New construction, stopped by war, must take care of expanding post-war transportation.

Power is the hub around which this whole operation turns. Road construction men are planning their work now, and that means big International crawlers on the dirt-moving jobs.

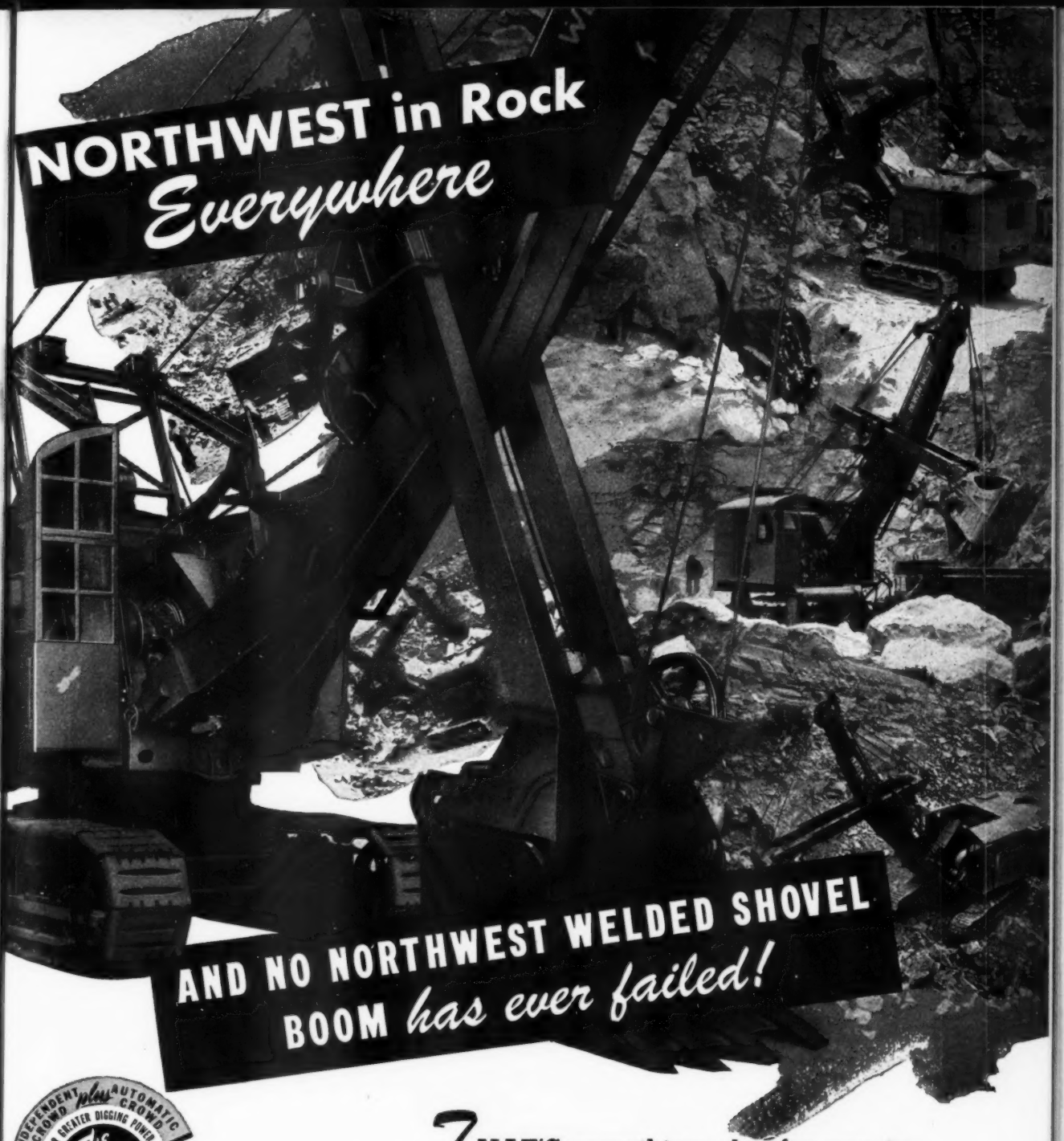
These rugged tractors have been making history on some of the toughest assignments of the war. As battling "bulldozers" they've spearheaded the action on every fighting front, paving the way for our fighting forces. War has proved they have what it takes to shove America's peacetime highways through with speed at lowest cost.

Harvester also builds the power units that put the push behind all kinds of graders, shovels, mixers and other road-building machines. With this equipment on the job you'll soon ride new roads in a peaceful and prosperous U. S. A.

BUY MORE WAR BONDS AND KEEP THEM!

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL POWER FOR POST-WAR



INDEPENDENT CROWD plus AUTOMATIC CROWD FOR GREATER DIGGING POWER
The 'DUAL CROWD

and when you have a real Rock Shovel you won't have to worry about output in dirt.

THAT'S something else for you to think about in your post war planning! Better built—cheaper to operate—a Real Rock Shovel and if you have a Real Rock Shovel you'll have high output in any kind of digging.

NORTHWEST ENGINEERING COMPANY
1750 Steger Bldg. • 28 E. Jackson Blvd., Chicago 4, Illinois

NORTHWEST

HERE'S THE REEL McCOY...

TIGER BRAND

—when you want superior wire rope

THERE are four good reasons why you can be sure of getting the utmost in quality and performance when you use AMERICAN TIGER BRAND WIRE ROPE.

First—all the steel used in TIGER BRAND is produced in our own mills and is quality-controlled in every step, from the ore to the finished product.

Second—the wire itself is drawn and stranded by the most modern methods and on the finest equipment anywhere available.

Third—into every foot of TIGER BRAND goes the knowledge and skill gained by more than 100 years of wire making.

Fourth—when our wire rope engineers recommend a particular type of TIGER BRAND for your service, there is no guessing involved. From practical experience, gained in the field, they know how the rope should act on your equipment and exactly what rope is safest and most economical for the service.

TIGER BRAND WIRE ROPE has proved its ability to deliver the goods in all sorts of service, under all kinds of conditions. So when you need wire rope—and want the best—get in touch with your distributor and ask for TIGER BRAND. The chances are getting better that he may be able to supply you.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Export Company, New York

USS *Excellay Preformed*

UNITED STATES STEEL

On the Quai de L'Ancien Arsenal in France, this 15-B excavates for a track spur to speed supply lines.

To open the way for military traffic, a 15-B clears away the debris from the streets of Domfront, France

FOLLOWING-UP THE ATTACK

At La Haye du Puits, in France, this 15-B tears down the condemned walls of a shattered building.

A ½-yard 15-B, in wartime wooden dress, clears a Beach in New Guinea to facilitate unloading cargo from landing craft.

Signal Corps Photos

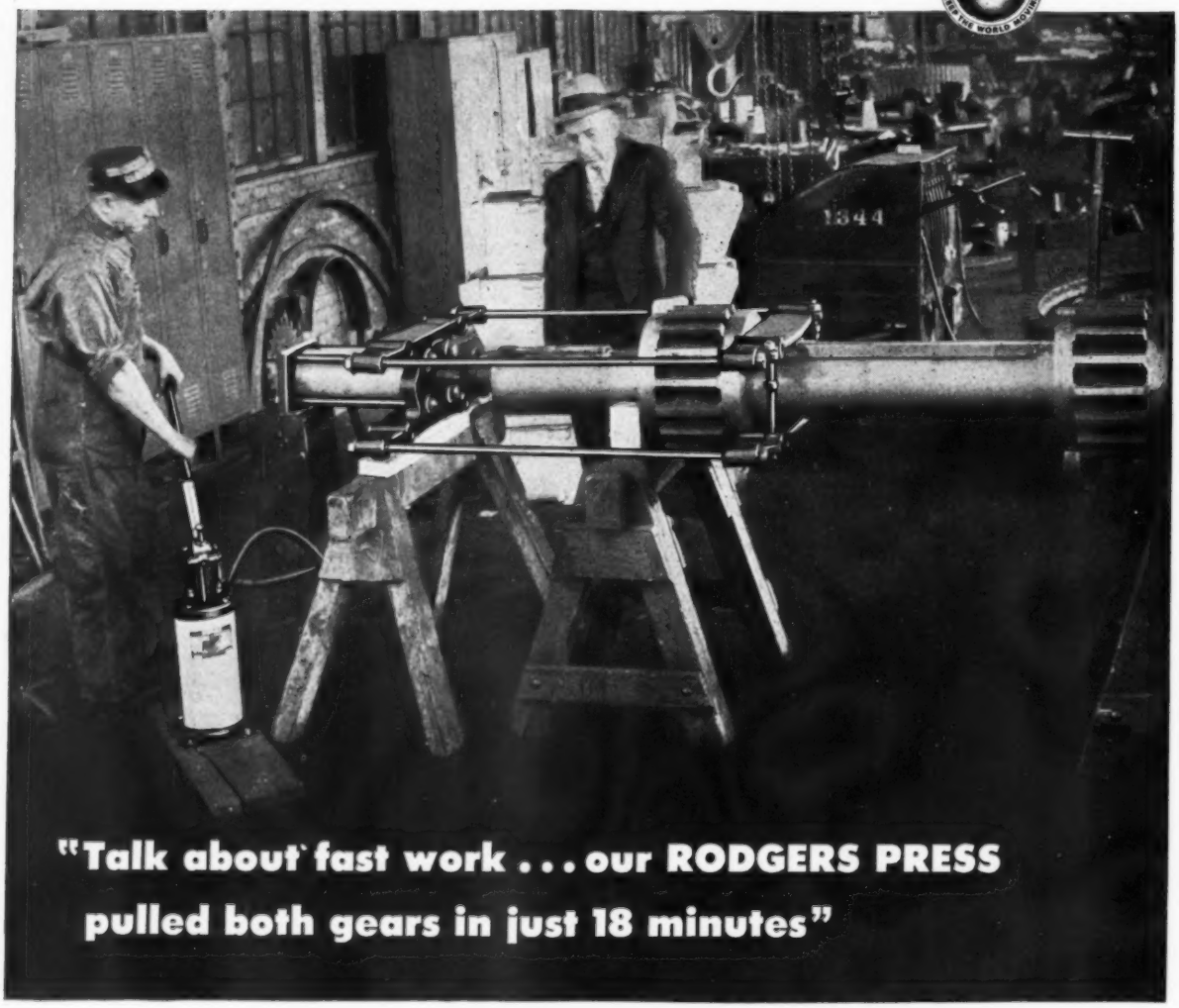
WHILE battle-front excavators help to put extra sting into the Allied attack, their counterparts behind the lines — in the wake of advancing arms — keep open the routes of supply. To them falls the job of repairing bomb-gouged roads, removing the rubble of blasted ruins, clearing the debris of battle.

By reason of their outstanding performance as well as their number, the Bucyrus-Eries in this work are, as always, conspicuous. Their easy handling, fast action, smooth application of power, and all-around strength again make them output leaders, just as they have been for years — and will be in the reconstruction to come.

BUCYRUS ERIE
SOUTH MILWAUKEE
WISCONSIN

V-76C

NO. 22 OF A "READY-WITH-A-RODGERS" SERIES



"Talk about fast work . . . our RODGERS PRESS pulled both gears in just 18 minutes"

"Pulling gears from a shovel shaft used to be a 12-hour grind before we got our Rodgers Universal Press. It meant dismantling our big shop press and reassembling it around the shaft... a job we had to do twice, to get at both gears.

"With the Rodgers, we now pull those same gears in 18 minutes. Your portable press has streamlined this operation . . . and that's just one way it is saving us time and money."

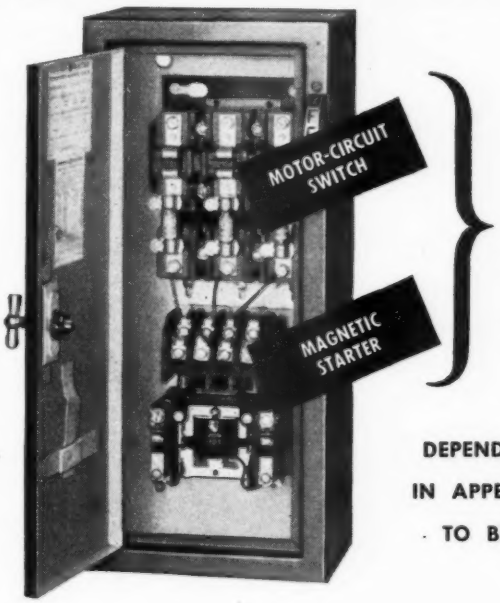
This experience was reported to us by one of the top manufacturers in the equipment field... is typical of many others describing the economical performance of the all-purpose Rodgers Universal Press. *Get complete information and prices today. Write or wire Rodgers Hydraulic, Inc.,* 7417 Walker Avenue, St. Louis Park, Minneapolis 16, Minn. *"If it's a Rodgers, it's the best in Hydraulics."*

Uses for **RODGERS UNIVERSAL HYDRAULIC PRESS**

Gear Pulling • Wheel Press Work • Jacking Pipe • Erecting Machinery • Relocating Machinery • All-Purpose Jack

RODGERS HYDRAULIC, Inc.

MOTOR STARTERS EVERY TYPE, EVERY KIND, FOR EVERY MACHINE APPLICATION



COMBINATION STARTERS

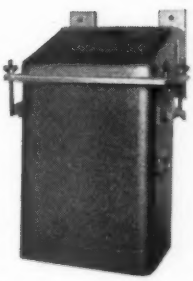
DEPENDABLE . . . ATTRACTIVE IN APPEARANCE . . . DESIGNED TO BLEND WITH MODERN MACHINES

Advantages of Combination Starters

1. ***50% reduction in mounting time***—You mount only one device, not two.
2. ***40% reduction in wiring time***—Connect to only 9 terminals, not 15. The switch and starter come connected.
3. ***Sure safety***—Cover cannot be opened while power is on the starter.
4. ***Reliable motor protection***—Protection devices co-ordinated at factory.
5. ***Saving of wall space***—The one device takes less space than two.
6. ***Improved plant appearance***—Single, streamlined case; less open wiring and conduit.

Whatever your plant's operating condition, you can get a suitable G-E combination control. This means a motor-circuit switch (with short-circuit protection) and a magnetic starter—in one, compact, easy-to-mount unit.

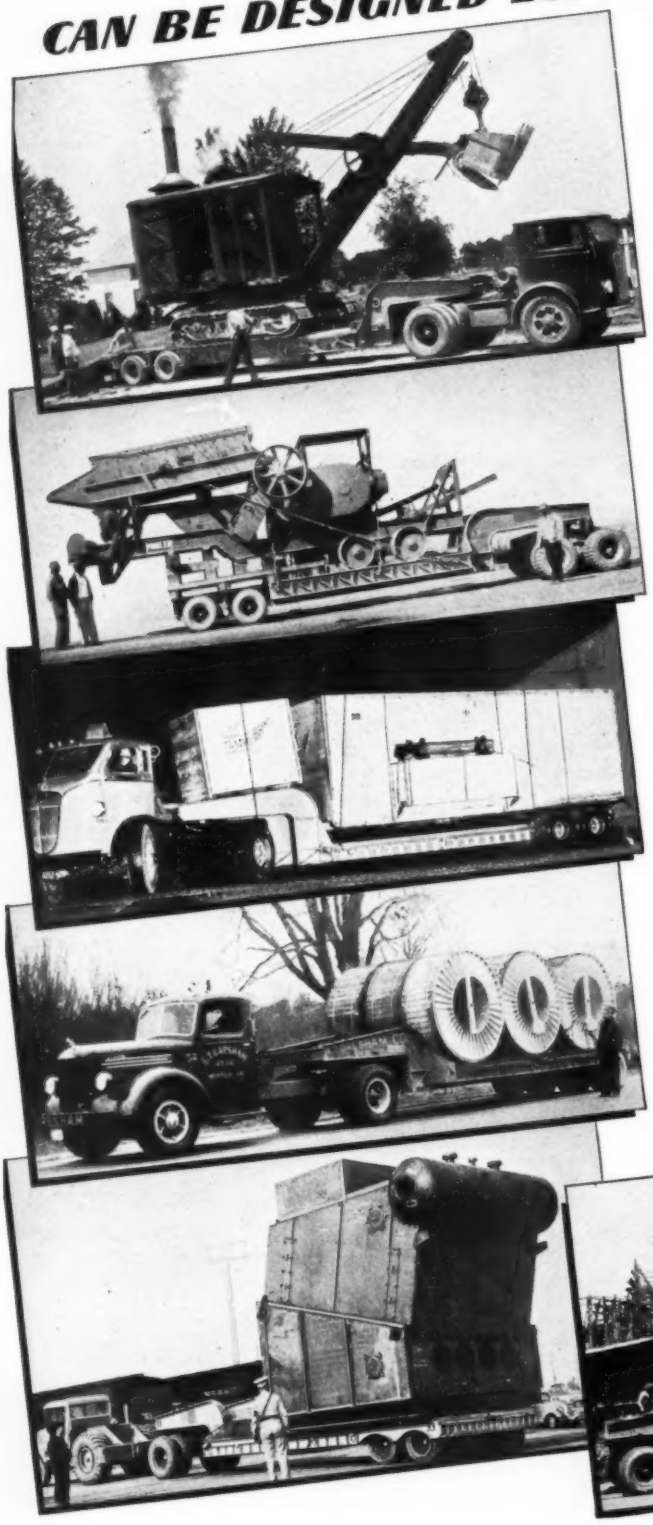
Write today for more information about these combination starters. Our engineers will be glad to help you select just the right starter for your application. *General Electric Company, Schenectady 5, N. Y.*

GENERAL PURPOSE	CORROSION RESISTANT	DUST-TIGHT	FOR HAZARDOUS LOCATIONS	WATER-TIGHT
				
Suitable for general-purpose indoor applications where atmospheric conditions are normal.	Made for corrosive atmospheres and hazardous locations. All arcing parts and terminals (of forms for hazardous locations) are at least six inches under oil.	For use in steel mills, cement mills, and other locations where the dust content of the atmosphere is heavy.	Designed to withstand internal explosions. The flanges, which are securely bolted on all sides, are ground to tolerances which will not permit the escape of gases.	Suitable for outdoor use, and for damp places indoors, such as dairies, breweries, and ship docks.

Buy all the BONDS you can—and keep all you buy

GENERAL ELECTRIC

THE CARRYALL YOU'LL NEED *Tomorrow* CAN BE DESIGNED ESPECIALLY FOR YOU *Today!*



IN PLANNING for tomorrow, it is well to ask yourself this vital question—**has the Carryall Trailer I plan to buy been designed for my particular job?**

Here's one important factor in bringing your hauling problem to Fruehauf: regardless of the type of hauling you do, Fruehauf engineers consider it as an individual problem.

The Carryall you'll need may range in capacity from 10 to 100 tons . . . it may be single or double-drop frame . . . side or rear loading . . . may have 4 tires or 24 . . . with any one of various wheel or axle combinations . . . any width . . . any length . . . the applications at Fruehauf are endless.

Today is not too soon to call in the Fruehauf man in your vicinity to help you get your post-war Carryall designed and ready for the production go-ahead. This service costs you nothing extra . . . but it may save many weeks later on.

• • •

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER CO., DETROIT 32

Service in Principal Cities

A TRUCK IS LIKE A HORSE — IT CAN PULL MORE THAN IT CAN CARRY

FRUEHAUF TRAILERS

"Engineered Transportation"

REG. U. S. PAT. OFF.

PLAN TODAY TO PROFIT ON THE LONGER HAULS OF TOMORROW

WITH THE FASTER POWER OF TOURNAPULLS YOU CAN EXTEND PROFITABLE HAUL DISTANCES . . . SAVE EQUIPMENT INVESTMENT AND CUT COST PER YARD . . . TRY IT

THE longer runways and straighter, wider highways, already planned for postwar, will require longer hauls than ever before. You can profitably handle those longer hauls with the rubber-tired power of Tournapulls. Operating from 2.6 to 14.9 m.p.h., Tournapulls get you cheap dirt on any haul from 300 feet to 3 miles.

Good haul roads, enable you to attain higher average speeds, thus move more yardage. Here Harrison Construction Co., long-time user of LeTourneau equipment, uses seven Super C Tournapulls to construct new runways on a Knoxville, Tennessee, airport.

COMPARE WITH CRAWLING TRACTORS

ONE WAY HAUL DISTANCE—CU. YDS. PER HOUR*

Tractor-drawn Scrapers:	400′	600′	800′	1,000′	2,000′	3,000′	4,000′	5,000′	6,000′
30-Yd. Capacity			175	153	97	71	56	46	39
23-Yd. Capacity		187	162	142	89	65	51		
18-Yd. Capacity	196	163	139	122	74				
15-Yd. Capacity	170	142	121	106	65				
With 15-Yd. Super C Tournapull you get:	200	180	168	156	116	91	76	65	55

* All units pusher loaded on level.

Note that even on short hauls—400 to 1000 feet one-way—Tournapulls compete very favorably with larger crawler-scraper outfits. While on longer hauls—2000 to 6000 feet—Tournapulls move from 19% to 41% more than even a 30-yard crawler-scraper outfit.

LOWER FIRST COST . . . LOWER OPERATING COST

Super C Tournapulls cost from $500 to nearly $7,000 less than crawler-scraper units of comparable hourly capacity. Hourly operating costs run approximately 4% to 21% less. Figure what that can mean to you on a 10,000-hour operating life.

Why penalize yourself with more costly, slow-moving rigs when you can have faster-moving, job-proved Tournapulls? You'll move more yardage, more profitably. See your LeTourneau distributor NOW for priority requirements and delivery dates.

LETOURNEAU
PEORIA, ILLINOIS • RICHMOND, CALIFORNIA

Job Proved — Over 2400 Tournapulls Built and Shipped

TOURNAPULLS

Manufacturers of TOURNAPULLS*, ANGLEDOZERS*, BULLDOZERS, TILTDOZERS*, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, TOURNATRAILERS*, TOURNACRANES*, TOURNATRUCKS*, SHEEP'S FOOT ROLLERS, TOURNAROPE*, TOURNAWELD*, TOURNALIFTS*.

*Trade Mark Reg. U. S. Pat. Off.

"Made to Order" for MORE PAY DIRT PER DAY

HERE ARE THREE REASONS WHY EUCLIDS CUT HAULING COSTS

DEPENDABILITY . . . Both Rear-Dump and Bottom-Dump EUCLIDS are built from the bottom up for heavy duty off-the-highway service. Continuous performance records on hundreds of the toughest mining and construction jobs are evidence of superior design, rugged construction and painstaking production.

VERSATILITY . . . Haul earth, rock, coal and ore with ample power for steep grades and difficult hauls . . . fast, easy loading with efficient loading equipment — shovels, draglines, elevating graders or transfer bins . . . quick, clean dumping on the fill or into hoppers.

EFFICIENCY . . . Pay loads of 15 to 30 tons hauled at top speeds of 21.8 to 34 m.p.h. . . . fast loading by efficient digging equipment, coupled with Euclid capacity and speed, results in lower cost per yard and increased production on all lengths of haul.

Compare Rear-Dump and Bottom-Dump EUCLID performance with other combinations or types of hauling equipment and you will know why leading contractors and industrials use efficient digging and loading tools and Euclid hauling equipment to keep costs down on both long and short hauls. Your Euclid distributor will be glad to supply helpful facts and figures for your hauling requirements.

The EUCLID ROAD MACHINERY Co. · · · Cleveland 17, Ohio

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH . . ROCK . . COAL . . ORE

EUCLID THE PIONEER

WORLD'S FASTEST CAMERA
Charts a Burst of Dynamite

TO CAPTURE pictures of explosives *in action,* Hercules scientists designed and built the world's fastest camera. Operating at exposures as fast as *one ten-millionth of a second,* this amazing instrument photographs dynamite at the very instant of its violent chemical change. Even powerful nitroglycerin's path of detonation, traveling at 250 miles a minute, is "stopped" on film by this shutterless, electrically operated camera.

This study of how explosives behave is only a small part of the intensive research being conducted daily by Hercules. Physicists, x-ray workers, microscopists, and other highly trained specialists are constantly searching for new and valuable knowledge on explosives which may prove helpful to you and your business.

---------- *HERCULES EXPLOSIVES* -----

HERCULES POWDER COMPANY
INCORPORATED
972 King Street
Wilmington 99 . . . . . Delaware

XR-40

Forty-acre Racine quarry operated by Consumers Company of Chicago being cleaned out at 55-foot level as new level is being sunk for future operations. Use Bucyrus-Erie 27-T drill on blasting operations at new level.

A NEW LEVEL IS being sunk at the 40-acre Racine, Wisconsin, Niagara limestone quarry operated by Consumers Company of Chicago. The event is one of historical importance to the company and especially to the 35 men working in this quarry, many of whom have over a quarter of a century of service in the present pit. As one of the men describes it, "It is something that happens to us but once in a lifetime."

Operations in this quarry, which borders the northern city limits of Racine, were started about 1900 and during these past 44 years an average 55-foot face has been quarried on the property. At the present time final cleaning-up operations at the old level are being conducted at the northern end of the pit, farthest away from the crusher and preparation plant. When operations are closed this year for the most severe weather months in this 10-month quarry operation, all stone that has been blasted this year will be cleaned out. The quarry operates five eight-hour days a week.

A Bucyrus-Erie 27-T steel cable electric blast hole drill using a six-inch bit was put into operation late

● Bucyrus-Erie 27-T electric blast hole drill using six-inch bits to drill 35-foot holes for blasting the cut for the start of a new level being sunk at the Racine quarry.

this last summer to drill the holes for blasting the cut for the start of the new level which is being sunk at the south end of the pit adjacent to the present hauling ramp to the crusher and preparation plant. This drill has a one-piece all-steel derrick that is 40 feet high, fitted with pipe braces. The crown sheave of the 27-T is mounted on rubber shock absorbers and the adjustable tool guide on the drill is rubber insulated. The caterpillar mounting has over-all dimensions of 11'-9" long and 9'-5" wide and has 14-inch treads. To power this drill a 15 H.P. variable speed, reversing motor with a V-belt drive is used.

The one driller operating this rig uses a 30-foot tool string weighing approximately 1500 pounds to drill 35-foot holes which are spaced on 10-foot centers. A combination 24-foot stem with an integral open side swivel wire rope socket is being used. A bit with a fairly sharp penetrating point and medium thick wearing surface is used in drilling the limestone that is creviced due to past blasting. About two holes are drilled on an average each eight-hour shift. An over-size tool guide about 8 inches in diameter is suspended from the drill's built-in tool wrench just above the hole being drilled.

At the time of the writer's visit to the quarry the bit being used had already drilled 400 feet without dressing. Bits are dressed in a forge shop on the quarry site.

Two Sanderson-Cyclone electrically operated manila rope drills using 5⅝-inch bits are drilling the last 57-foot holes for blasting the final face at the present level. This face will be blasted next spring to supply stone for the plant until the new cut is big enough to produce enough stone for the plant's capacity. Each of these Sanderson drills averages about a hole a day.

Blasting Operations

In blasting operations at the Racine quarry it was found that on an average, it takes about a pound of explosive for each three and one-half tons of stone blasted. They blast at this quarry three or four times a year and because of the proximity of the city only two or three holes are blasted at a time when blasting operations are being carried on. Trojan 5x17 powder is the principal explosive used, although Atlas gelatine dynamite, 5x16, is now being used for blasting in the sinking of the new level. Previous blasting has broken up the base of the old level and fissures underneath the floor are often filled with surface drainage water. The gelatine dynamite sinks in water and therefore it was thought to be a safer practice to use this explosive rather than one that floats.

Not much secondary blasting is necessary at the Consumers Company Racine quarry because most of the rocks too large to handle with the loading shovels are used for breakwater stone. The little secondary blasting that is found necessary is done with Atlas 1x8 gelatine dynamite. Holes for secondary blasting are drilled with an Ingersoll-Rand Jackhamer and about a dozen holes are shot at a time.

By the time the stone from the last blasting of the present level is loaded out, the new level cut will be big enough to accommodate a larger power shovel to load out stone than the 1¼-cu. yd. Lorain diesel now being used in the 35-foot second cut. When this cut gets big enough to accommodate a power shovel with a longer reach the floor of this cut will be dropped another 25 feet or so and then the remainder of the quarry will be worked at this face of 55 or 60 feet.

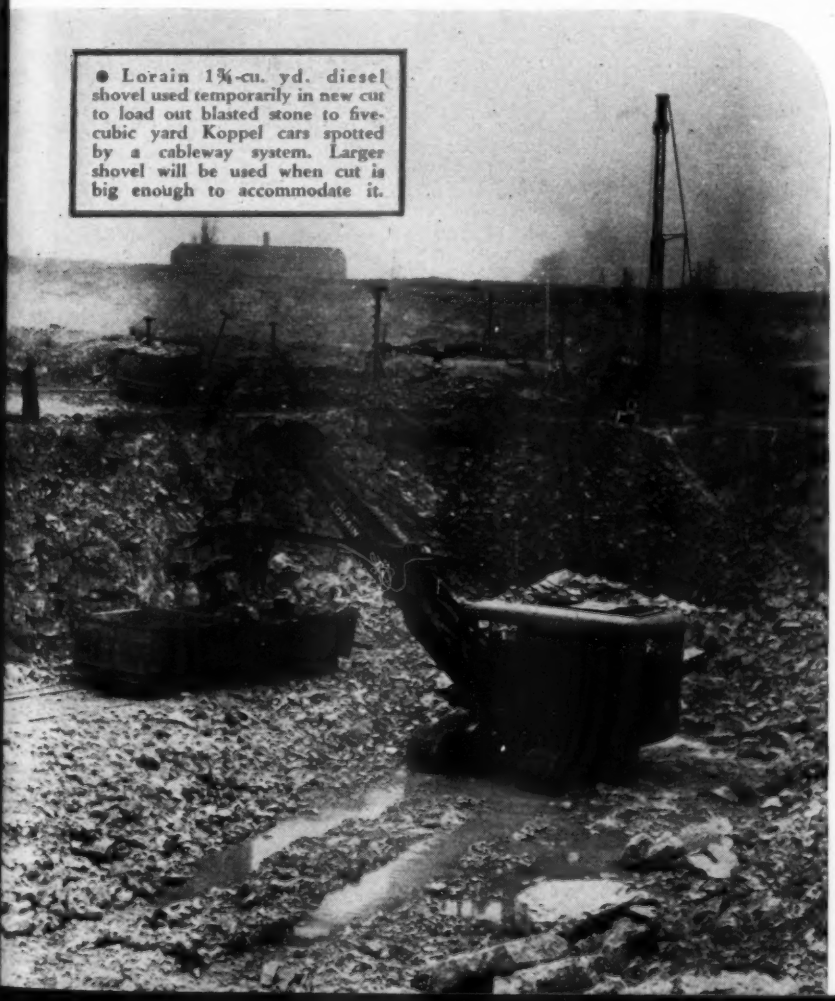
A Bucyrus 78-C 2½-cu. yd. railroad type steam shovel manufactured in 1918 and with caterpillar mounting added in 1925 has been loading the stone in this quarry since 1932 and is now cleaning up the present level at the north end of the pit.

A bulldozer and shovel were used for carrying on stripping operations which are now completed at the quarry. The overburden consisted of topsoil and clay and ran from four feet in thickness at the west end of the quarry to 14 feet at the east end of the pit. The dirt stripped was sold for fill.

All stone loaded by the Bucyrus steam shovel and the Lorain being used temporarily in the new level cut is hauled to the primary crusher and preparation plant in Koppel all-steel standard gauge 5-cu. yd. railroad cars that are pulled by dinky engines to a cableway at the foot of the crusher and plant on the high wall of the south end of the pit. Eighteen Koppel cars and two 20-ton Davenport saddle-type steam locomotives are used for pit haulage over about a mile of standard gauge rail.

Quarry officials have improvised a haulage track layout that enables them to get the stone to the crusher and plant from the new level being sunk without materially interfering with its present haulage system.

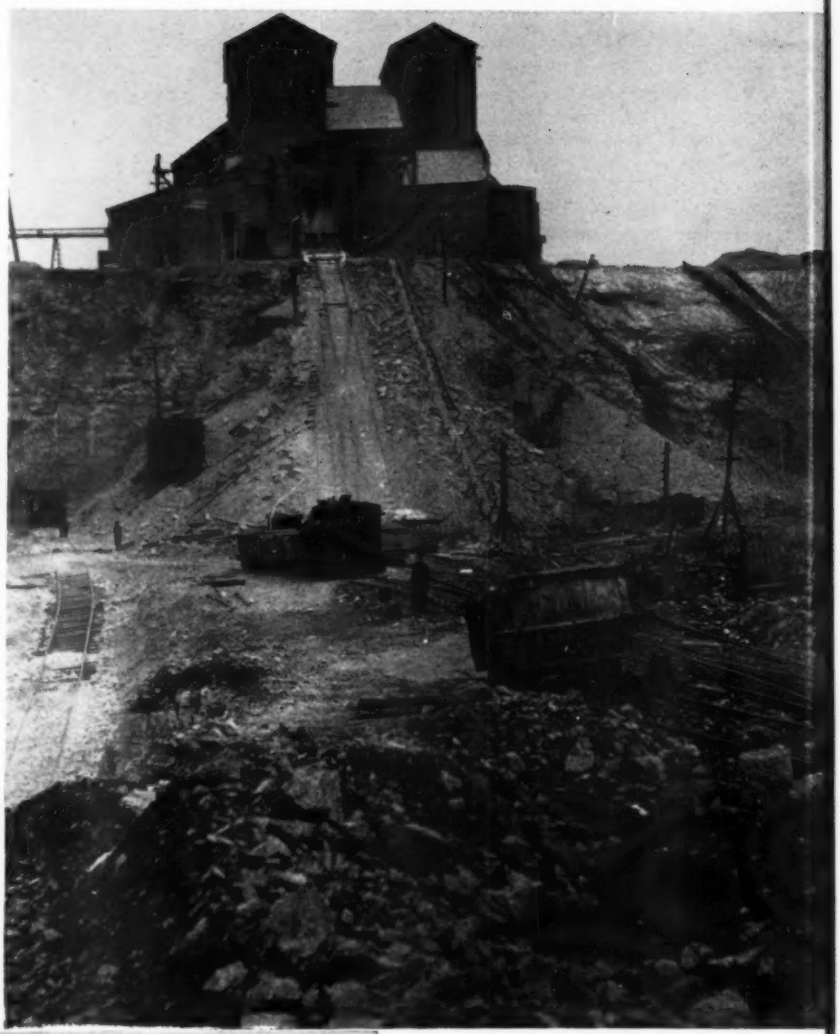
The Bucyrus steam shovel loads



● Lorain 1¾-cu. yd. diesel shovel used temporarily in new cut to load out blasted stone to five-cubic yard Koppel cars spotted by a cableway system. Larger shovel will be used when cut is big enough to accommodate it.

units of five cars hauled from the bottom of the cableway to the north end of the pit by one of the locomotives on a loop track running close to the face around the entire pit. The dinky remains coupled while the steamer loads the cars from between the high wall and the tracks. When the cars are loaded, the locomotive then pulls the cars back to a loaded-car-ramp from which they are pulled, one at a time, up to the crusher on the cableway. While waiting for empties to haul back to the steam shovel the engine may haul empties to and bring back loaded cars from another cable haulage ramp at the new level cut. The locomotives change off and either may be used to haul on the regular loop run or to the switch-off serving the new cut, depending upon which locomotive is free at the time the empties are ready to be hauled to either loading location. In wet weather when it becomes more difficult to get traction, four instead of five car units are hauled on the loop run. Three car units are used on the new cut.

While three cars that have been spotted by a cableway are being loaded in the new cut, one of the engines will pick up three empty cars at the loading ramp, couple to the front of the engine, and back up to a switch-off track to the new cut. The engine



• General view of pit from preparation plant. Tracks leading to preparation plant cableway in left foreground and new cut in right foreground. Bucyrus 78-C 2½-cu. yd. steam shovel cleaning up at old level is in center background.

• Cable haulage system to primary crusher and preparation plant on top of high wall at south end of pit. Loaded Koppel cars are pulled up the ramp on tracks to the right and empty cars are lowered on tracks on left side of ramp. Hoist house for cable system to new cut is in center left.

then goes forward pushing the empties on the switch-off to the new cut cableway where three loaded cars will be waiting. The loaded cars are coupled to the empty car unit and then the engine backs out of the switch-off with the two three-car units of empty and loaded cars. When it gets back on the main haulage line the engine goes forward and pushes the full cars to the loading ramp. The loaded cars are uncoupled from the unit of three empty cars and the engine again backs to the switch and then pushes the empties into the new cut cableway and uncouples and goes back to the loading ramp to pick up another unit of empty cars, either for the same cut or for the regular loop

run. The new cut cable system then spots the empties at the shovel and after they are loaded hauls them back up to a switch-off where they are picked up by the next engine that comes in the switch-off with three empties and the procedure just described is repeated.

Lidgerwood single drum hoists with one-inch Macwhyte steel cable are used on the cableways to the primary crusher and at the new cut. The loaded cars, pulled up one at a time on the cableway at the preparation plant, are pulled up on one of two sets of rails to a transfer car which hauls it over the crusher where it dumps its load and then lowers the empty car down the ramp on another track.

The Racine quarry preparation plant consists of an Allis-Chalmers 36-inch primary crusher, two No. 6 Allis-Chalmers secondary crushers, two 4-foot Symons crushers, one 16"x30" Universal roll, one 18"x36" Lippman hammer mill, two Allis-Chalmers 48-inch washing screens and nine vibrating screens consisting of two Robbins — one triple deck and one double deck — a Niagara, two Jiggers, and two Lippmans. Material is brought up into the plant on an Allis-Chalmers elevator belt with attached 44-inch steel buckets. There are two similar elevator belts with 32-inch buckets and two 24-inch and one 20-inch belt conveyors used in the plant.

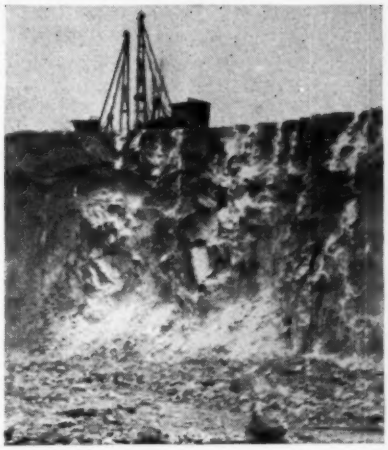
About 70 per cent of the annual production of 250,000 tons of finished product is shipped by rail over a spur run to the quarry from the Chicago & Northwestern railroad main line near the plant. The rest of the production is trucked to consumers. The preparation plant has two loading hoppers that are used for both rail and truck haulage. Railroad cars are handled on the company property by the quarry's own 50-ton American saddle-type oil burning locomotive. Stockpiled material is loaded from several bins at the quarry by 20-ton Browning and 20-ton McMyler locomotive cranes, each equipped with 1½-cu. yd. clamshell buckets. Stockpiles of various size material average about 50,000 tons at the Racine quarry.

There is no waste product at Consumers Company Racine quarry. In addition to the breakwater stone that runs in size from ½ to 4 tons the following sizes of limestone are produced: agricultural stone, ground at the plant and shipped in bulk; fine screenings, ¼-inch to dust; coarse screenings, ½-inch to dust; concrete stone, ¼-inch to ¾-inch; fine medium, ¾-inch to 1½-inch; medium, 1½-inch to 2¼-inch; macadam stone, -inch to 3½-inch, and a size ranging from 4 inches to 10 inches.

The Northwest used for stripping and casting is also used for loading out the breakwater stone to trucks.

There is no special drainage problem at this quarry due to the contour of the surrounding area. One six-inch centrifugal pump raises all water that collects in the pit.

Mr. Otto Cheska is superintendent of Consumers Company Racine quarry. The company has two other stone quarries: McCook, Illinois, and Bellwood, Illinois, and three gravel pits which are operating and located in Illinois at Libertyville, Crystal Lake, and South Beloit. Stone is sold chiefly for road ballast, flux, agricultural limestone, and paving and concrete work. The sand and gravel market is about evenly divided with about half being shipped outside of Cook County and the balance in the Chicago market is shipped to dealers as well as to retail yards where the company operates.



• Two Sanderson-Cyclone electrically operated manila rope drills using 5⅞-inch bits drilling last 57-foot holes for blasting the final face at the present level at the north end of the pit.

Robert C. Fenner, president of Consumers Company, became chairman of the board, and William J. Kelly became president of the company on December 1st. Under its postwar plans the company is contemplating extensive re-equipment of its properties, the acquisition of new sources of supply and possible additions to and relocations of its present production and distribution systems.

• Stockpiled material of various sizes is loaded to hoppers for truck loading by a 20-ton McMyler locomotive crane equipped with clamshell bucket.

Repair and
Dippers wi

Suggestions offered in selection of rod and procedure to follow in the maintenance of a power shovel dipper by welding. Identify materials most commonly used in welded dippers.

● Hard-facing the manganese steel lip of a 2¼-cu. yd. welded dipper protects it against wear, especially in abrasive digging.

By R. L. FOWLER

(Engineer, Dragline Buckets and Dippers, Bucyrus-Erie Company)

THE APPLICATION OF A welded type dipper to a power shovel previously equipped with an all-cast dipper has in many cases increased production up to 25%. This increased production is made possible because the lighter weight of the welded design allows increased dipper capacity without overloading the shovel front end. An overloaded front end means resulting distress in all parts of the machine.

However, it must be realized that because of its lighter construction the wearing parts of a welded dipper may need extra maintenance precautions if the increased production through the use of this type of dipper is to be continued. Most of the repair and maintenance work on a dipper involves welding and it is the purpose of this article to assist the welder in properly identifying the materials used in a welded dipper and to offer some suggestions in the selection of rod and the procedure to follow when making repairs. It must be understood, however, that the quality of the finished job is directly dependent on the ability and good judgment of the welder.

At the outset it might be well to stress the fact that it is of the utmost importance when repairing a crack, whether it be in the plates or castings, to see that the crack is chipped or burned out entirely, cleaned, and properly prepared before welding is started. Recommended procedure is discussed in this article.

Manganese Steel

Manganese steel is used in dipper construction most commonly in the lip, and in some cases the teeth and the latch keeper. Its high tensile strength, great toughness and ability to "surface harden" under repeated impact make it a very satisfactory steel to use in dipper parts subjected to the most severe punishment. Manganese steel, as we know it today, was discovered by Robert A. Hadfield of Sheffield, England, in 1882 and was first cast in America in 1892. Manganese steel contains 1.00% to 1.40% carbon and 11 to 13% manganese. It is non-magnetic and will, therefore, not attract a magnet. A small horseshoe magnet is often used in the field to identify manganese steel.

Cracks seldom develop in properly designed and properly maintained manganese castings. However, if these castings are not properly maintained against wear when used in abrasive digging when no impact is evident, the loss of metal in the highly stressed sections may result in their ultimate failure.

"Hard facing" weld deposits on manganese steel for protection against abrasive wear are easy to apply and are offered by most rod manufacturers in various types and sizes, together with proven recommendations for proper procedure to follow for application. When selecting a "hard facing" rod it is important that the supplier be informed that it will be used on manganese steel.

When it becomes necessary to weld

Maintenance of Welded Manganese Steel Lips

manganese steel castings that have developed cracks especial precautions must be taken in the preparation and welding to insure good results. Since it is impractical to chip manganese steel it is necessary to "V" out a crack with an oxy-acetylene torch or carbon arc in preparing the casting for welding. The "V" groove should be thoroughly cleaned before welding. A stainless steel 18-8 rod is recommended for welding manganese steel; however, other rods have been developed and used successfully for the same purpose. It is of utmost importance to avoid heat concentrations during welding because heat is very injurious to manganese steel. Never preheat or postheat manganese steel when welding it. In stainless steel 18-8 rod the nickel and chromium in the rod tends to prevent the formation of free carbides, or hardening carbides, by holding them in solution with the manganese.

If the temperature in the casting adjacent to the weld zone reaches a point where you cannot comfortably hold your hand on it, welding should be stopped and the casting allowed to cool. If the crack is of sufficient length to allow "skip welding," this practice should be followed to avoid heat concentrations.

Stress Relieving

Inasmuch as manganese cannot be preheated or postheated, the only means of stress-relieving a manganese weld is to peen it. Peening requires good judgment on the part of the welder for peening done with a sharp-nosed tool, or after the weld is cold, will do more harm than good. Never deposit a bead more than three inches long before peening and be sure to use a small rod in welding to insure good penetration at the bottom of the groove.

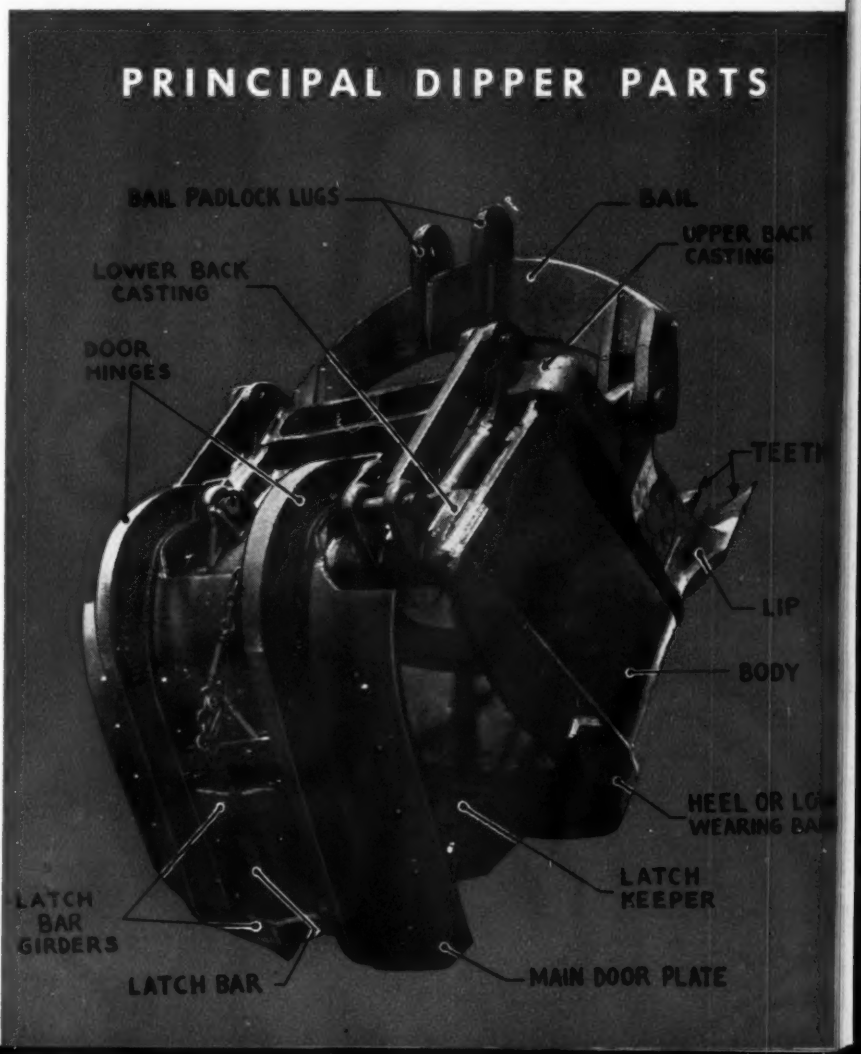
When it becomes necessary to weld manganese to steel, as the joint between the lip and body of a dipper, a stainless steel 18-8 rod should be used. Here it is especially important that heat concentrations be avoided, not only because one of the parts involved is manganese steel, but also because the coefficient of expansion and heat conductivity of manganese and steel vary. If heat concentrations are not avoided when welding manganese to steel, cracked welds and highly stressed zones will be the result.

Dipper Teeth Maintenance

Dipper teeth can be cast in manganese or alloy steel or forged from high carbon steel. Tooth maintenance is especially important for the teeth are the cutting tools of a power shovel. They absorb practically all of the initial shock and abrasive wear in the digging operation and their cutting efficiency is greatly depended upon to help the shovel maintain high production.

Dipper teeth of several manufacturers are reversible and when they become rounded off on one side they should be turned to prolong life. Reversed teeth give the dipper fresh digging life and will do a good job until worn down again. They may be reversed for the second time to revive their cutting abilities, but usually after the second reversal the limit of wear is reached. Dull teeth not only reduce shovel efficiency but also result in a more costly and difficult sharpening or pointing job.

Because of the various methods and types of materials handled, it is difficult to establish hard and fast rules concerning tooth maintenance. High carbon teeth can be repointed by forging or welding. At present the welding method is most popular. The high carbon teeth can be repointed by using a high carbon rod to replace the lost metal and then applying a coat of suitable "hard-facing" material. Because of the high carbon contents, it is advisable when welding teeth to preheat the tooth in the



welding zone and set up to work on one or two teeth intermittently.

Manganese steel teeth can be built up by welding or repointed by using a diamond-shaped applicator bar to replace the lost material. The suppliers of the rod or applicator bar can furnish information on field-proven methods of repointing manganese teeth.

Body of Dipper

The body of a welded dipper is usually made of alloy steel plates joined at the rear by an upper and lower back casting. In some cases, however, no castings are used in the back construction, while in other cases a one-piece cast back is used.

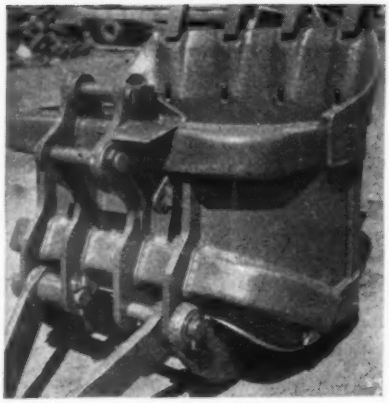
When used, the top and lower back castings are made of carbon steel and in welding castings in this classification the procedure is different from that recommended for manganese steel in that it is better to chip rather than burn in preparing for the weld. After a crack in these parts has been prepared and thoroughly cleaned the welding should be done with a mild steel rod.

Welding of alloy steel body plates requires the use of a high tensile rod.

The heel or lower wearing bands of a dipper are made either of alloy or rolled manganese steel. Alloy steel replacement bands can be attached to the dipper body by welding with a high tensile rod. When manganese bands are used, a stainless steel 18-8 rod must be used.

Door, Bail, Latch Mechanism

The welded door assembly consists of the main door plate, in some cases a liner plate, cast or plate hinges and



• **All-welded back construction of a ¼-cu. yd. dipper.**

the latch bar guides. A mild steel rod should be used in welding these parts.

When replacing wornout door plates welding procedure is important to prevent distortion. A distorted door plate will not contact the bottom face of the dipper properly and the twisting strains introduced will eventually lead to failure.

Welded or cast bails are made of alloy steels and in maintaining these parts a high tensile rod should be used. If the bail is made of manganese steel, the procedure for maintenance of manganese steel parts must be used.

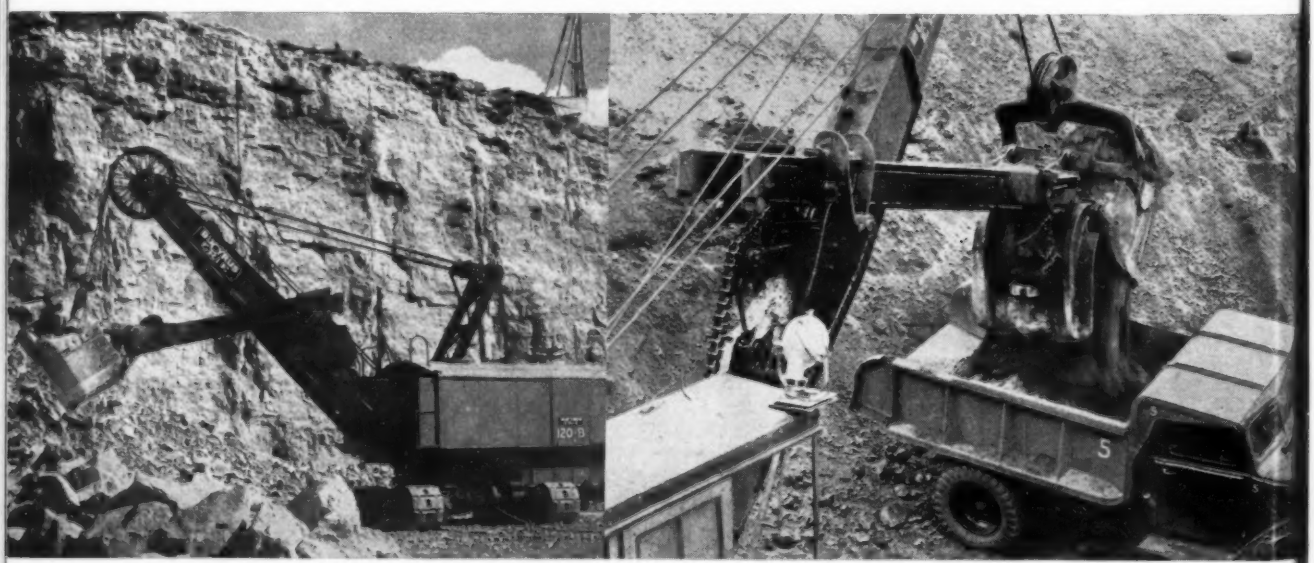
Proper adjustment of the latch mechanism is the best insurance against a costly maintenance job. The latch bar and latch keeper insert of a dipper are usually made of a high carbon steel bordering on the tool steel range. Although these parts have been successfully welded, the high carbon content makes welding difficult. The use of a high carbon rod and preheating before welding is necessary, although results are hard to predict.

Preheating and Stress Relieving

The value of preheating carbon and alloy steels for welding is being recognized more each day in shops and in the field. Precautions taken before and during welding operations eliminate the possibilities of cracks and highly stressed zones, and in most cases postheating to relieve stress is unnecessary. The proper temperature for preheating is from about 500° to 600° F. and can be determined from a blue color appearing on a newly chipped area, or by the use of a temperature indicator chalk made for this purpose. A mark is made with this chalk on the part to be heated and when the proper temperature is reached the chalk marked on the casting melts. Manganese steel should never be preheated for welding or postheated after welding.

In conclusion it can be stated that the application of a hard-faced weld deposit to any part of a dipper that shows excessive wear has been proven economical in the long run. In rock jobs hard-facing can also be applied to the bail lugs to reduce wear.

It it worth repeating — the quality of the finished job is directly dependent on the ability and good judgment of the welder.



• **Left: Rough digging in material like this gives a shovel dipper some real punishment. Right: Free-flowing material like this usually has an abrasive action on the dipper, especially on the lip, and so hard-surfacing the lip prolongs dipper life and reduces maintenance.**

Gibraltor of the Burma Road

Chinese tunnel under and blow off top of mountain held by Japs to safeguard section of Burma Road.

• Photo taken at moment of detonation of 6,000 pounds of TNT under Jap positions on crest of Sungshan mountain.

UNABLE TO REDUCE JAP positions at Sungshan (Pine Mountain) known as the Gibraltor of the Burma Road, where enemy guns, mounted on the seemingly impregnable mountain heights, swept the Burma Road far below, the Chinese blew up the mountain top and took the position.

In their two years of occupation of Sungshan the Japs had heavily fortified Sungshan and adjacent peaks, with their guns hidden in pillboxes, trenches and buried tanks. Excellently prepared fields of fire, carefully surveyed by the Japs, made the attempts by the Chinese troops to storm the positions an almost suicidal operation.

Captain Peter S. Hopkins, a member of the Y-Force Operations Staff, American military mission to China, and his fellow Americans who were acting as liaison officers with Chinese decided to bring to bear a little old-fashioned Yankee ingenuity on the problem. Together with the Chinese engineers, the Americans decided to dig their way up the mountain.

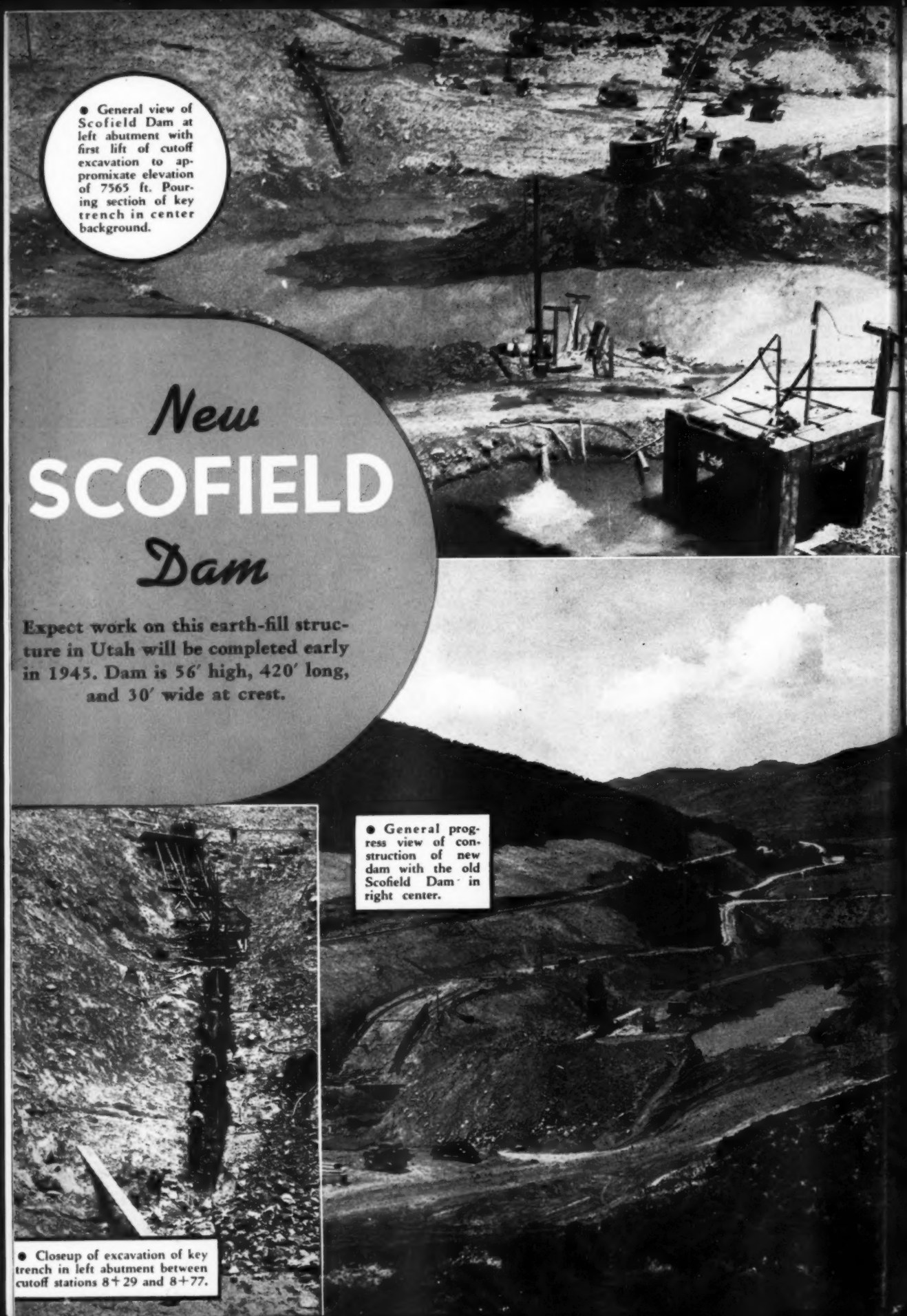
Approach trenches were pushed forward with the Chinese shoveling away day and night with an almost complete disregard of their personal safety as machine-gun fire sprayed over their heads and mortar shells burst near them.

"We finally worked our way well up toward the crest of the mountain and then tunneled into its side. The tunneling went ahead night and day, up and under the Jap positions. We carefully estimated the two points on the main peak of Sungshan where the bulk of the Japanese defenders were concentrated. When the tunnel had progressed to these points, 6,000 pounds of American TNT was carried into the tunnel, placed in position and wires run out of the tunnel back to the spot where our electric plunger was set up," Captain Hopkins related.

"One of the Chinese pushed down the plunger and the whole mountain top seemed to rise in the air. Some 70 Japs entrenched there died in the blast. The few prisoners who were taken were dazed by the shock. This blast was the beginning of the end for the Jap garrison. Following the explosion the Chinese stormed up the mountain and occupied the craters left by the blast," Captain Hopkins said.

The Japs who escaped death in the blast counterattacked but the Chinese repeatedly repulsed these assaults and the remnants of the garrison were forced into isolated pockets and gradually mopped up.

• Top: Crater on crest of Sungshan mountain caused by explosion under Jap position by Chinese and Y-Force operations staff engineers. Right: Captain Peter S. Hopkins of Boston, engineering officer who assisted Chinese in blowing top off Sungshan mountain in China.



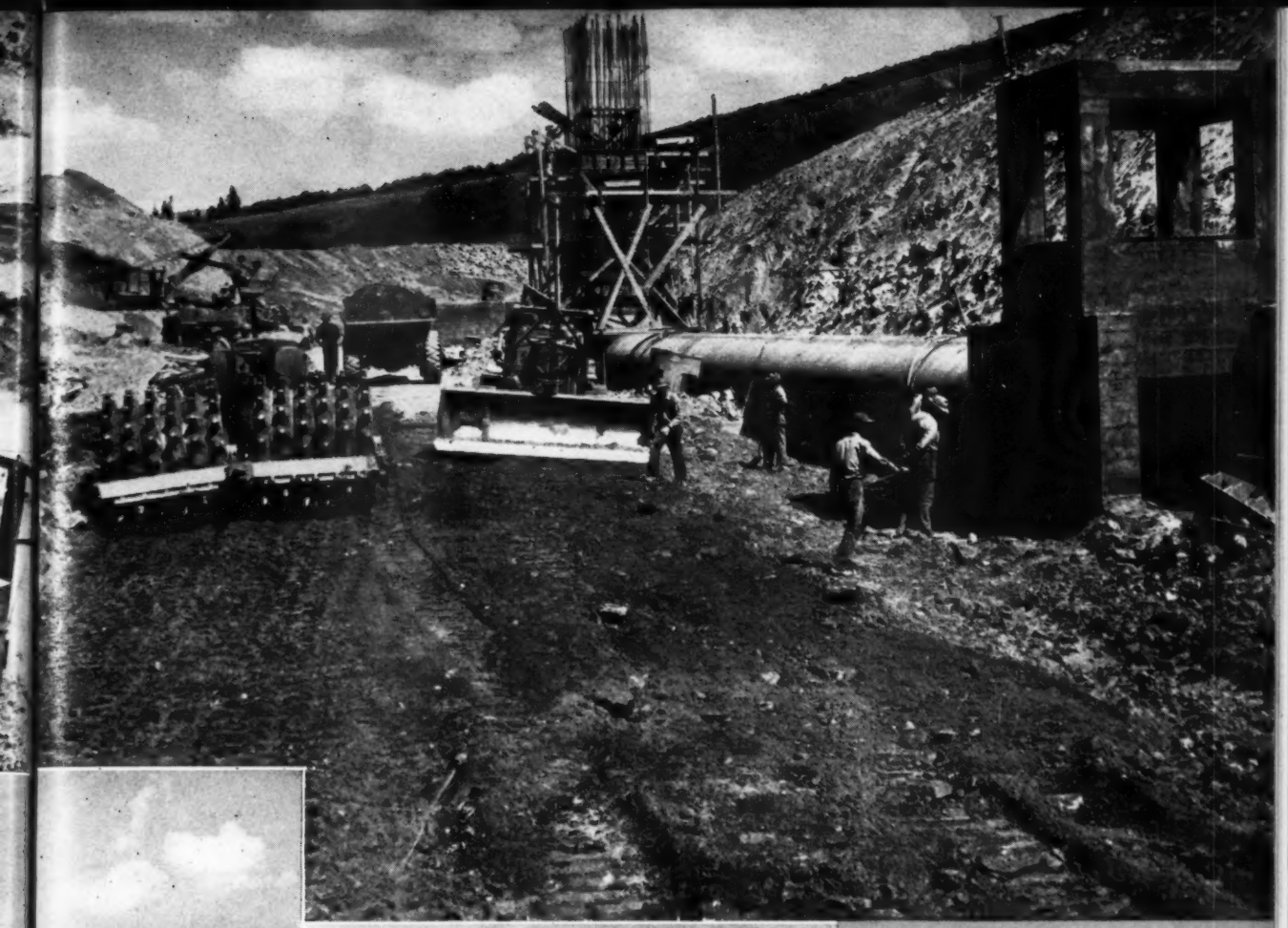
● General view of Scofield Dam at left abutment with first lift of cutoff excavation to apromixate elevation of 7565 ft. Pouring section of key trench in center background.

New SCOFIELD *Dam*

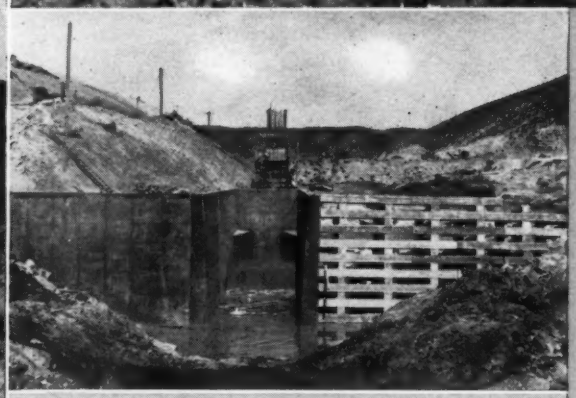
Expect work on this earth-fill structure in Utah will be completed early in 1945. Dam is 56′ high, 420′ long, and 30′ wide at crest.

● General progress view of construction of new dam with the old Scofield Dam in right center.

● Closeup of excavation of key trench in left abutment between cutoff stations 8+29 and 8+77.



● Placing section of diversion dike within the compacted earth section of the dam.



● Above: Water starting through outlet works. Bulldozers in right center are making closure of dike. Below: Discharge through outlet works has reached 215 C.F.S. three days after the top picture was taken.

IN SPITE of the difficulties encountered in securing supplies and labor, work is progressing on the Bureau of Reclamation's Scofield Dam in Carbon County, Utah, scheduled for completion early in 1945. Because of the severe winters in the area, work may be suspended until Spring.

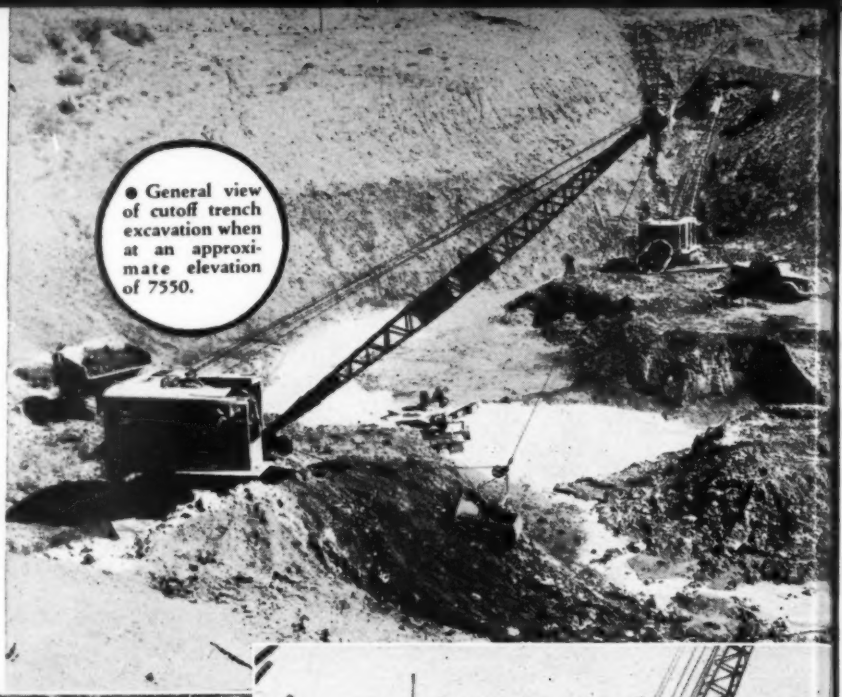
The new Scofield Dam will replace an old dam built by private interests in 1925-26. This old dam was in danger of collapse and its failure would not only have endangered the lives of hundreds of people, but would have flooded vital coal mines serving the Columbia Steel mill in Utah, the Kaiser Steel mill in California, and war plants in the Pacific Northwest. Failure of the old dam would also have washed out the main line of the Denver and Rio Grande Western railroad which carries heavy war traffic, and cut off all irrigation water for rich agricultural land in the Price River Valley. It was to avert this possible catastrophe that in 1943 the new dam was authorized for construction

All pictures used to illustrate this article are through the courtesy of the Bureau of Reclamation.

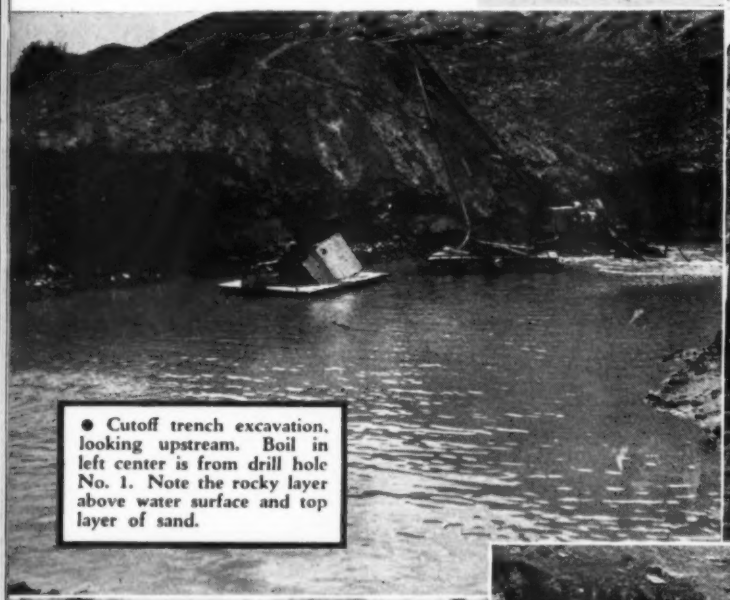
as a major feature of the Bureau of Reclamation's Scofield project for flood control and war food production.

The new Scofield Dam will be an earth-fill structure, 56 feet high, 420 feet long, and 30 feet wide at the crest. The total estimated cost of construction is $720,000, of which $393,000 is allocated to flood control.

Storage of 73,000 acre-feet of water by Scofield Dam will stabilize the supply for 12,500 acres of land in the Price River Valley and form the basis for providing supplemental water to the nearby Gooseberry project of 20,000 acres, under study in the extensive postwar plans of the Bureau of Reclamation. It is expected that the new Scofield Dam will provide opportunities for permanent settlement to returning servicemen and demobilized war workers, in addition to the rehabitation of existing families.

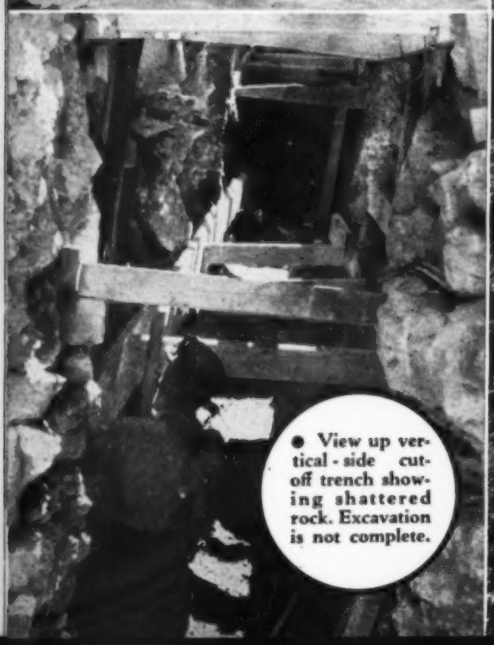


● General view of cutoff trench excavation when at an approximate elevation of 7550.



● Cutoff trench excavation, looking upstream. Boil in left center is from drill hole No. 1. Note the rocky layer above water surface and top layer of sand.

● Placing invert form and tying the reinforcement in the outlet works. This view is looking upstream from about station 5+50.



● View up vertical-side cutoff trench showing shattered rock. Excavation is not complete.

● A general view of the spillway excavation, looking upstream.

HOW TO OUTWIT "E. JUPITER PLUVIUS" *with* Buckeye Trenchers!

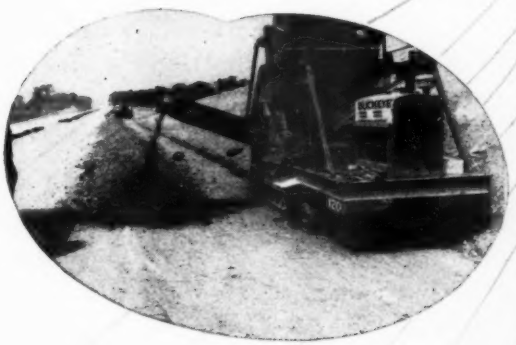
When "E. Jupiter Pluvius," rain maker of ancient mythology, sends showers he has no respect for roads and airports. Rain falls everywhere. For crops, it's fine; but allowed to permeate black top or to saturate the subgrade under asphaltic or concrete roads or landing strips, it's bad medicine. Water is a powerful solvent; in addition it exerts a tremendous force in expanding upon freezing.

The importance of adequate drainage for roads and airports has been abundantly demonstrated. Where Buckeye trenchers had a part in the job, there has been a welcome absence of crack-ups and sink-holes.

You can't prevent storms, can't "umbrella" pavement; but you can get rid of the water that collects, through proper drainage, preventing destruction to paved surfaces.

Modernly designed, soundly engineered Buckeye trenchers are ideal for drainage work; so scores of contractors and highway engineers tell us. Now available under priority regulations; soon they can be had by all.

Model 120 digging herringbone laterals and roadside outfall trench on U. S. Route 22 east of Harrisburg, Pa. Rain won't bother this highway.



SAVE THE SURFACE with PROPER DRAINAGE

Fast, compact Model 120 Trencher digging lateral to outfall trench at Waterloo, Iowa airport. Note how the well balanced "120" crosses outfall trench without planking.

Buckeye Traction Ditcher Co., Findlay, Ohio

Built by **Buckeye** ✓

Convertible Shovels Road Wideners Trenchers
Spreaders R-B Power Finegraders Tractor Equipment

Shots from the FIRING LINE

Centralize Control with Construction Bureau

J. A. Krug, Chairman of the War Production Board, announced that, in order to provide a centralized point of control over all matters pertaining to construction within WPB, a Construction Bureau is being established, responsible to Hiland G. Batcheller, Operations Vice Chairman. The bureau will be headed by Arthur J. McComb, of Montclair, N. J., who has been serving as director of the Office of Industry Advisory Committees.

The Construction Bureau will include the existing Building Materials Division, the Construction Machinery Division, the Plumbing and Heating Division and the bulk of the Facilities Bureau, which is being abolished.

A Bureau Requirements Committee is being established to pass on all construction requirements and construction programs and all major construction projects. It will also review the requirements of the divisional requirements committees of the component divisions of the Construction Bureau. Appeals from its determinations will be taken only to the central requirements committee of WPB.

Mr. Krug pointed out that establishment of this bureau not only provides a centralized point of control for the handling by WPB's operating divisions of all problems in the construction field, but also furnishes a mechanism through which construction work can be actively promoted whenever diminishing war requirements make that possible.

Under the new set-up, a manufacturer or a contractor who seeks approval for a building project will go to the WPB operating division that has jurisdiction over his field, just as he would have done in the past. The Construction Bureau will not eliminate the responsibility of these divisions and their respective requirements committees for sponsorship of such projects, but it will provide a means through which the prospective builder can have all of his problems handled in one place, so that it will not be necessary for him to deal with a number of separate WPB divisions.

The Facilities Committee will be abolished as soon as the Bureau Requirements Committee is in full operation, WPB said. The Materials Control Division, the Project Analysis Branch and the Tax Amortization Branch of the Facilities Bureau's Project Essentiality Division are being transferred to the Construction Bureau.

• Well-digging bulldozer. By pushing excavated earth through a side wall, two bulldozers, in 10 days' operating time, dug this 44-foot deep conical well 59 feet in diameter at the top and 24 feet at the bottom on the bank of the Willamette River at Salem, Oregon. Water from the river, whose bed is 12 feet above the bottom of the well, will enter the well through a 36-inch flume reaching from the well to a basin of sheet piling constructed at the edge of the river. The well will supply a nearby industrial plant with 8,640,000 gallons of water required for daily usage.

Reject New Jersey Plan to Eliminate Highway Fund

New Jersey voters decisively rejected at the November 7 election a proposed new state constitution which contained a provision eliminating the present state highway fund and merging automotive taxes with general funds.

In drafting the proposed new charter, the State Legislature last winter ignored appeals of highway users for inclusion of a provision outlawing highway fund diversion. The one-fund proposal was opposed by highway user groups on the ground that it would make easier the highway fund diversions practiced by the state in the past to the extent of more than $129,000,000.

Bituminous Coal Stocks Lower Than Last Two Years

With the heating season in northern States already under way, the Nation faces heavy winter requirements with bituminous coal stocks millions of tons lower than those of either of the two preceding war years, Solid Fuels Administrator for War Harold L. Ickes announced.

Stocks of bituminous coal in consumers' hands on October 1, on which

PUTTING THE PROVE IN IMPROVEMENTS

• *This bucking bronco is a "Caterpillar" Diesel D2 Tractor taking one of the many "hurdles" that are designed to test its toughness on the "Caterpillar" Proving Grounds.*

• *A "Caterpillar" Diesel D4 Tractor pulling a drawbar dynamometer and loading car to test the pulling power of a certain grouser design in various kinds of soil surfaces.*

IF YOU'RE a long-standing "Caterpillar" Diesel user, you know that changes and improvements go into "Caterpillar" Diesel products the minute they're ready and right. There's no waiting for "yearly models."

Through the years, "Caterpillar" has given you such notable refinements as copper bellows seals for final drive, oil coolers, absorbent-type oil and fuel filters, finger-tip steering, "Hi-Electro" hardening for many vital parts, multi-speed transmissions and scores of others. Economy and dependability have been constantly improved. Only the basic design remains. It was *right* from the start.

Every improvement that has ever gone into a "Caterpillar" Diesel product has first been subjected to the stiffest laboratory and proving-ground tests that could be devised. The net result is Product Dependability. With every manufacturing step controlled by one organization in one factory, there can be no possibility of compromise with quality.

Dependability is the outstanding characteristic of "Caterpillar" dealers, too. Today they are in a position to give your "Caterpillar" Diesel equipment the kind of inspection, adjustment, maintenance and repair it needs to work at peak efficiency from now until Victory is won. Call on *your* "Caterpillar" dealer regularly.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

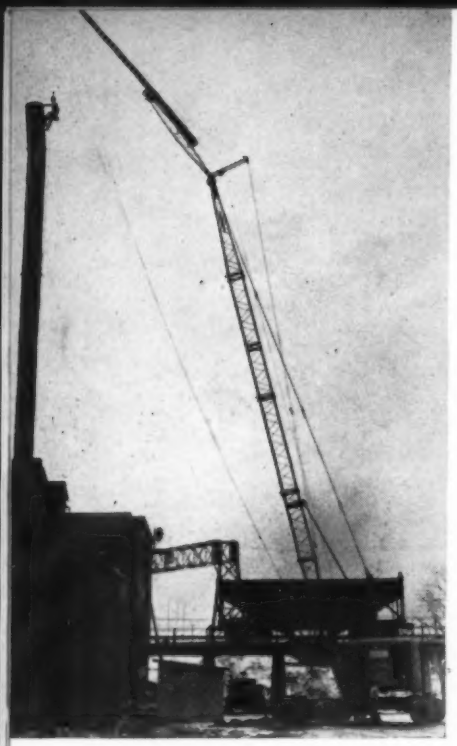
• • •

DEPENDABLE is the word for "Caterpillar" Diesel

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TO WIN THE WAR: WORK—FIGHT—BUY MORE WAR BONDS!



• Suspended in a "bosun's chair" from the tip of a 45-foot pole lashed to the end of the jib on a 135-foot boom of a rubber-tired General Supercrane, Lon Westfal is doing some steeplejacking deluxe as he repairs a 110-foot stack damaged in a storm. Equipment, as well as credit for the ingenious idea, belongs to Henry Selinsky, Canton, Ohio, contractor.

reports were available, totaled only 64,905,000 tons, in comparison with 72,866,000 tons on the same date in 1943 and with 87,311,000 tons on October 1, 1942.

Soft coal stocks on October 1 were about 996,000 tons above revised estimates for September 1. However, the average of 43 days' supply on hand in terms of consumption during the month remained the same as that of September 1, reflecting the seasonal rise in coal use. Daily consumption during September was estimated at 1,523,733 tons or 1.4 per cent more than that of August.

Increasing consumption, coupled with production limitations imposed by manpower shortages, is likely progressively to cut into these stocks as the winter advances, Administrator Ickes said. Substantial withdrawals will put many consumers, with low stocks now, below the danger point of coal protection. It is obviously imperative that all consumers must conserve coal, he said.

Production of war-essential bituminous coal in the two critical Southern Appalachian mining districts, Nos. 7 and 8, in Virginia, West Virginia, eastern Kentucky and part of Tennessee from April 1, start of the present fuel year, to October 21, totaled 103,256,000 tons. This was 78,000 tons less than output in the corresponding period last year, when work suspensions cut heavily into production.

During the week ending October 21, the output of the two districts totaled only 3,436,000 tons, in comparison with 3,566,000 tons mined in the comparable week last year. To meet estimated requirements for the year of 196,100,000 tons of these coals, which are needed urgently by war industries, it would be necessary to mine 3,771,000 tons weekly throughout the entire year.

Bituminous coal produced in all mining districts in the week of October 28 totaled 12,150,000 tons, as compared with 11,800,000 tons in the preceding week, and with 10,026,000 tons mined in the similar week of last year, when miners were leaving the pits before the November work suspension.

McMenimen and Crowe Win "Moles" Awards

Francis T. Crowe, constructor of Boulder Dam, and William V. McMenimen, builder of Pacific naval bases, will receive Awards "for outstanding contributions to construction progress," given each year to a non-member and to a member by The Moles, New York organization of tunnel and heavy construction men. Formal presentation will be made at a dinner meeting at the Roosevelt Hotel February 7, according to an announcement by Edmund A. Prentis, chairman of the Award Committee. More than 600 leading engineers and construction men are expected to attend.

Selected for the member award in recognition of the executive and construction skill with which he has aided in development of naval air bases throughout the Pacific, McMenimen is chairman of the Executive Board of the group of eight contractors responsible for the huge undertaking known as Pacific Naval Air Base Contractors. Its construction has, up to the present time, exceeded $1,125,000,000. The PNABC group has built bases at Guam, Wake, Midway, the Hawaiian Islands and other secret locations, together with the operation of huge procurement bases covering Chicago, Joliet, Fort Hueneme, Oakland, Alameda, Seattle and Tacoma. Mr. McMenimen began his career as general superintendent on construction of the McAdoo tubes under the Hudson River between New York and New Jersey for the Hudson and Manhattan Railroad. As vice-president and general manager of the Raymond Concrete Pile Co., he has, since 1918, had direct supervision over construction aggregating more than $246,774,511, including difficult foundations, borings, drydocks, hydroelectric developments, marine shipways, tunnels, and flood conservation. Among his major peacetime undertakings were the Lake Pontchartrain and San Mateo bridges and the piers for the San Francisco-Oakland Bridge.

W. V. McMenimen

Francis T. Crowe

To Frank Crowe, non-member award winner, belongs credit for construction of such great dams as Guernsey, Deadwood River, Boulder, Copper Basin, Gene Wash, Parker, and Shasta. Of him it has been written, "To the extent it

Water Seasoned AS THE "MARS"

Designed for special service and tested under most gruelling conditions Owen Dredging Buckets have proved to be uncommonly efficient and durable for difficult under-water operations.

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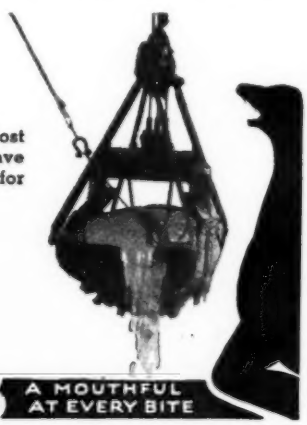

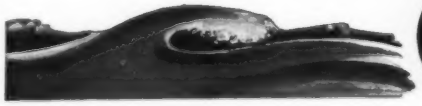

OWEN BUCKETS A MOUTHFUL AT EVERY BITE

From steel making to rope laying...we never forget this fact...that pound for pound, wire rope has more bearing surface than any other piece of equipment. That's why you can depend on...

WHAT can you expect from Roebling? Rope that has known capacity to deliver service. Engineering, in our plant and at your job, to put the rope to work right. Maintenance practices that protect its long life. Your postwar profits and postwar jobs will depend in part on operating rope-rigged equipment at lowest cost. You can leave that part to Roebling.

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ROEBLING

PACEMAKER IN WIRE PRODUCTS

can be said to belong to any single man, Boulder was Frank Crowe's triumph." As general superintendent for Six Companies, Inc., he completed Boulder, the world's highest (726 ft.) dam, in five years — two years and two months ahead of schedule. After Boulder came Parker, the deepest concrete dam ever built, with foundations extending 250 ft. below river bed. In 1939 he became general superintendent for Pacific Constructors, Inc., on the 602-ft. high Shasta Dam, second highest concrete dam ever built. The unique concrete pouring system for this dam involved a 460-ft. high headtower from which seven cableways led to the tailtowers.

Mr. Crowe began his engineering career with the U. S. Bureau of Reclamation for which he worked on several noted dams, including Jackson Lake, Arrowrock and McDonald Lake. As first assistant to the superintendent of construction on Arrowrock, which was for 20 years the world's highest dam, he designed a comprehensive concrete conveying and distributing system, as well as a pipe system for the pneumatic transportation of cement.

Among the winners of The Moles awards in previous years are Lieutenant General Brehon B. Somervell, chief, Army Service Forces; Vice Admiral Ben Moreell, chief, Bureau of Yards and Docks, Navy Department; and Robert Moses, commissioner of parks, New York City.

• The bed of a 100-year old canal provides the unusual right-of-way for the new million-dollar access road to Wright Aeronautical Engine Works near Cincinnati, Ohio. Removal of the old Miami and Erie Canal locks presented a problem because the masonry could not be blasted in the midst of a residential district. Byrnes-Conway Company of St. Bernard, Ohio, contracted to do this rush war job and use the "plug and feather" method of breaking up the concrete masses, using a power drill powered by a Davey Compressor.

Adoption of $11,250,000 Idaho Program Urged

An Idaho road construction and maintenance program to cost an estimated $11,250,000 in the first three postwar years was urged in a resolution adopted October 13 by the Idaho State Planning Board.

Approximately $7,000,000 of the total cost would be provided by state and local units of government, of which $3,150,000 would be for matching federal funds expected to be available under legislation pending in Congress.

J. D. Wood, executive secretary of the board, explained that this budget for state highways would exceed present income of the state for highway purposes. Depressed because of war conditions, this income is now approximating $1,000,000 a year, he said, but could be expected to gradually increase after the war. The road program is badly needed, he declared, and it would be an extremely short-sighted policy to plan for the next three years entirely on the basis of currently curtailed revenue.

The board recommended that the highway program be so arranged as to equitably distribute responsibility for its development and financing among the federal, state and local governments.

SAUERMAN

Long Range Machines

SAVE LABOR! SAVE POWER! CUT COSTS!

Above picture shows a 3 cu. yd. Sauerman Scraper with its power unit mounted on a skid-frame, as used to build a gravel revetment on a long section of eroded river-bank. The scraper dug gravel from a bar in mid-stream and placed this material in a sloping fill at the rate of 130 cu. yd. an hour and at a total cost of a few cents per yard handled.

MANY excavating jobs involving hauls of 100 to 1500 ft. are simplified by using a Sauerman Power Scraper or Slackline Cableway which digs, conveys and places the materials in one operation.

First cost of a Sauerman Machine is reasonable, maintenance expense is small and labor is reduced to a minimum. Moreover this equipment is very flexible; is readily adapted to meet any new working conditions.

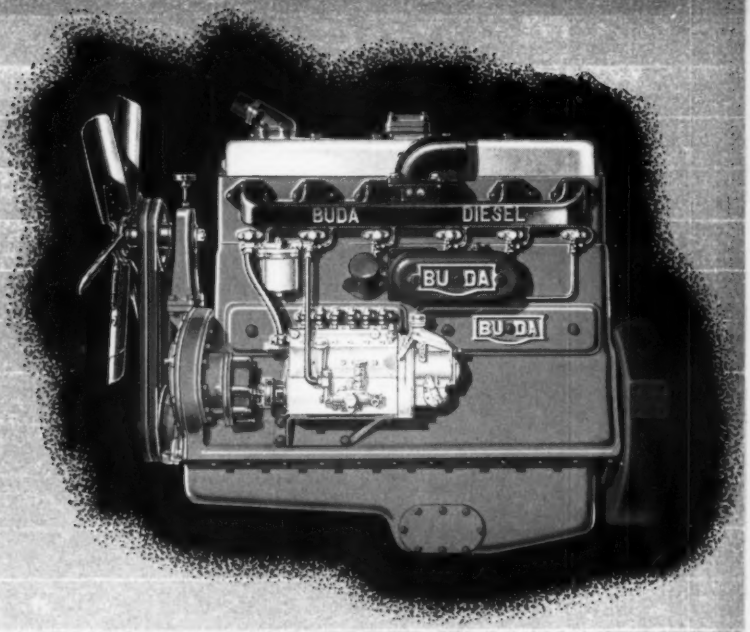
A wide choice of sizes is available, offering handling capacities all the way from 10 to 600 cu. yd. an hour.

GET THIS BOOKLET—Field data supplied by contractors, engineers, gravel producers, mine operators, etc., are part of the interesting contents of the Sauerman catalog. Write today for your copy of this useful book.

SAUERMAN BROS., Inc., 574 S. Clinton St., CHICAGO 7

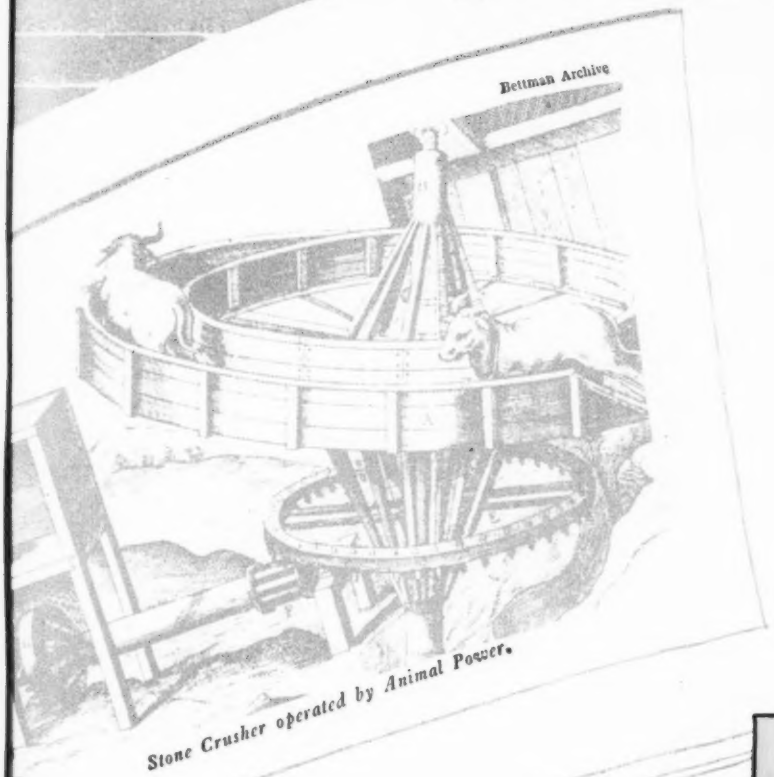
Arthur Johnson Elected President of The Moles

Arthur A. Johnson, New York contractor, has been elected president of The Moles, New York organization of tunnel and heavy construction men. He is president of the Arthur A. Johnson Corp. and chairman of the Post-War Public Works Committee of the General Contractors Association of New York. Last February he received the 1944 Moles Award for "outstanding contributions to construction progress." For more than 35 years he has been engaged in building subways, tunnels and other important engineering works in and around New York, including the Bermuda Air Base, the Letterkenny Arsenal at Chambersburg, Pa., and preparation of the site of the New York World's Fair. He recently completed his fifth term as president of the Cham-



Power...

precedes progress



Stone Crusher operated by Animal Power.

The problem of efficiently propelling equipment in the by-gone days was largely a matter of insufficient power.

Today you can have the finest, most modern, efficient power ever developed, by specifying BUDA Diesel Engines.

Write or wire for literature.

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• The fuselage of a wrecked Jap plane left on the beach at Kiska in the Aleutian Islands is crushed by this Caterpillar D-4 tractor with LeTourneau Angeldozer.
U. S. Signal Corps Photo.

ber of Commerce of the Borough of Queens.

Other newly elected officers of The Moles are: Alfred N. Warwick, Eugene F. Warwick, Inc., first vice-president; Charles B. Spencer, Spencer, White & Prentis, Inc., second vice-president; Edward J. Mahoney, Mahoney-Clarke Co., sergeant-at-arms; William W. Hanley, Jr., Koppers Co., secretary; and Ralph W. Atwater, Shultz Dredging Co., treasurer.

Trustees chosen include William V. McMenimen, Raymond Concrete Pile Co.; Hamilton O. Penn, H. O. Penn Machinery Co., Inc.; Carlton S. Proctor, Moran, Proctor, Freeman & Mueser; Robert K. Tomlin, Construction Methods; Frank W. Barnes, Merritt-Chapman & Scott Corp., and Edmund A. Prentis, Spencer, White & Prentis, Inc.

Report Made on New U. S. Construction Activity

New construction activity in the United States during October, 1944, totaled $308,000,000, the War Production Board reported. This volume was six per cent under the September, 1944, level and 40 per cent below the volume of October a year ago.

Continuation of construction controls and seasonal factors are expected to restrict the volume of work put in place during the remaining two months of the year, resulting in an estimated $3,700,000,000 volume for the year 1944 — less than half the construction volume of 1943. This estimate excludes repair activity, and in this respect differs from construction activity estimates compiled by other Federal agencies, WPB pointed out.

Privately-financed construction activity during October totaled $121,000,000, a seven per cent decline from the previous month and 12 per cent under the October 1943 activity. In this category, residential work accounted for $39,000,000; industrial—$14,000,000; utilities—$40,000,000; farm — $15,000,000; and community buildings (commercial, hospitals, social and recreational, etc.)—$13,000,000. This privately-financed work as a whole is expected to decline seasonally in November by 12 per cent, WPB said.

Work financed by public funds in October amounted to $187,000,000, a six per cent over-the-month decline and 50

WELLMAN WILLIAMS TYPE BUCKETS

SINCE 1931 Wellman Buckets have combined the many special mechanical features of the famous Williams Clamshell Bucket with the construction "know-how" of The Wellman Engineering Company. For 50 years Wellman has built heavy bulk material handling equipment for steel plants and other heavy industries.

Welded Rolled Steel Construction
FOR GREATER STRENGTH
LIGHTER WEIGHT • LONGER LIFE

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SALES AND SERVICE AGENCIES IN PRINCIPAL CITIES

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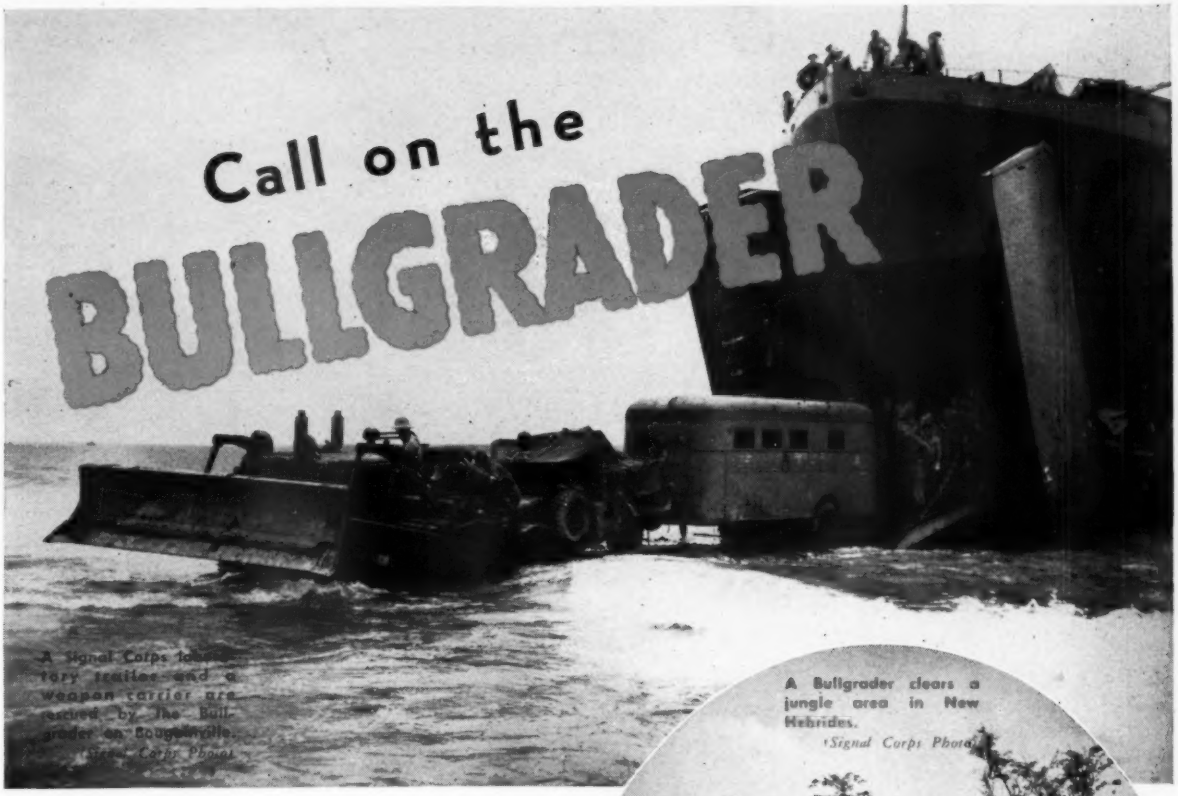


A Signal Corps tank, military textiles and a weapon carrier are received by the Bullgrader on Bougainville. (Signal Corps Photo)

A Bullgrader clears a jungle area in New Hebrides. (Signal Corps Photo)

In this war it's a habit to call on Bucyrus-Erie Bullgraders for fast work on a host of difficult jobs — from routing out buried pillboxes and 'dozing through shattered ruins to rescuing mired vehicles and clearing out jungle for agriculture. The speed and ease with which it handles its work makes this versatile unit a popular, efficient handyman.

What Bucyrus-Erie Bullgraders contribute in speed and efficiency to backing up the fighting man, they will give you on your postwar work. The inestimable value of a machine with ability to do many things well — that's what you get if you, too, call on the Bullgrader!

N-80C

This Bullgrader cleans up debris of a demolished Jap refinery. (Signal Corps Photo)

BUCYRUS ERIE
TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

per cent under the $377,000,000 volume of October a year ago. Military construction totaled $57,000,000 in October; Government-financed plant construction — $55,000,000; Government - financed housing—$8,000,000; and all other non-industrial construction (community buildings, highways, sewer and water, conservation, etc.)—$67,000,000. Activity in publicly-financed types as a whole is expected to decline 18 per cent in November.

Machinery and equipment deliveries to Government - financed industrial plants in October totaled $64,000,000, slightly less than the September rate, but 59 per cent under the $156,000,000 volume of deliveries in October a year ago. Moderate declines in deliveries during November and December will bring the total volume of deliveries in 1944 to an estimated $950,000,000 as compared with $2,680,000,000 in 1943, WPB's Construction Research Section reported.

A.S.C.E. Announces Two Annual Award Recipients

For the first time in the history of the American Society of Civil Engineers its two annual awards have been made to the same institution—the University of Illinois. Dr. Ralph B. Peck and Dr. Nathan M. Newmark, both members of the University's civil engineering staff, will be the recipients. The honors will be presented at the society's annual meeting, to be held in New York in January.

Dr. Ralph B. Peck, U. of I. research assistant professor of soil mechanics, is to receive the Norman medal, highest award of the A.S.C.E., for his paper on "Earth Pressure Measurements in Open Cuts of the Chicago Subway."

Dr. Nathan M. Newmark, research professor in civil engineering now on leave of absence from the university for service with the army in the Pacific, is to receive the Croes medal, which since 1912 has been awarded by the A.S.C.E. to the paper "next in order of merit to the paper to which the Norman medal is awarded." Dr. Newmark's paper is on "Numerical Procedure for Computing Deflections, Moments and Buckling Loads."

• Quick-Way truck crane loads munitions from a DUKW to a truck which will take them to the front lines of one of the European invasion fronts.

LINN CATRUK AND SEMI-TRAILER

THIS LINN CATRUK, as a prime mover, is equipped with rotable crane, seating capacity for a crew of 14, large tool compartments and, in combination with a quickly detachable **LINN SEMI-TRAILER,** has a definite use as a cargo, salvage, construction or emergency vehicle.

Equipped with both tracks and wheels (the hydraulic retraction makes the change from wheels to tracks in a matter of seconds) permits the negotiation of highway or cross country with equal facility.

THE LINN MANUFACTURING CORP. Morris, N. Y.

Maine Has Road Plans Ready to Go

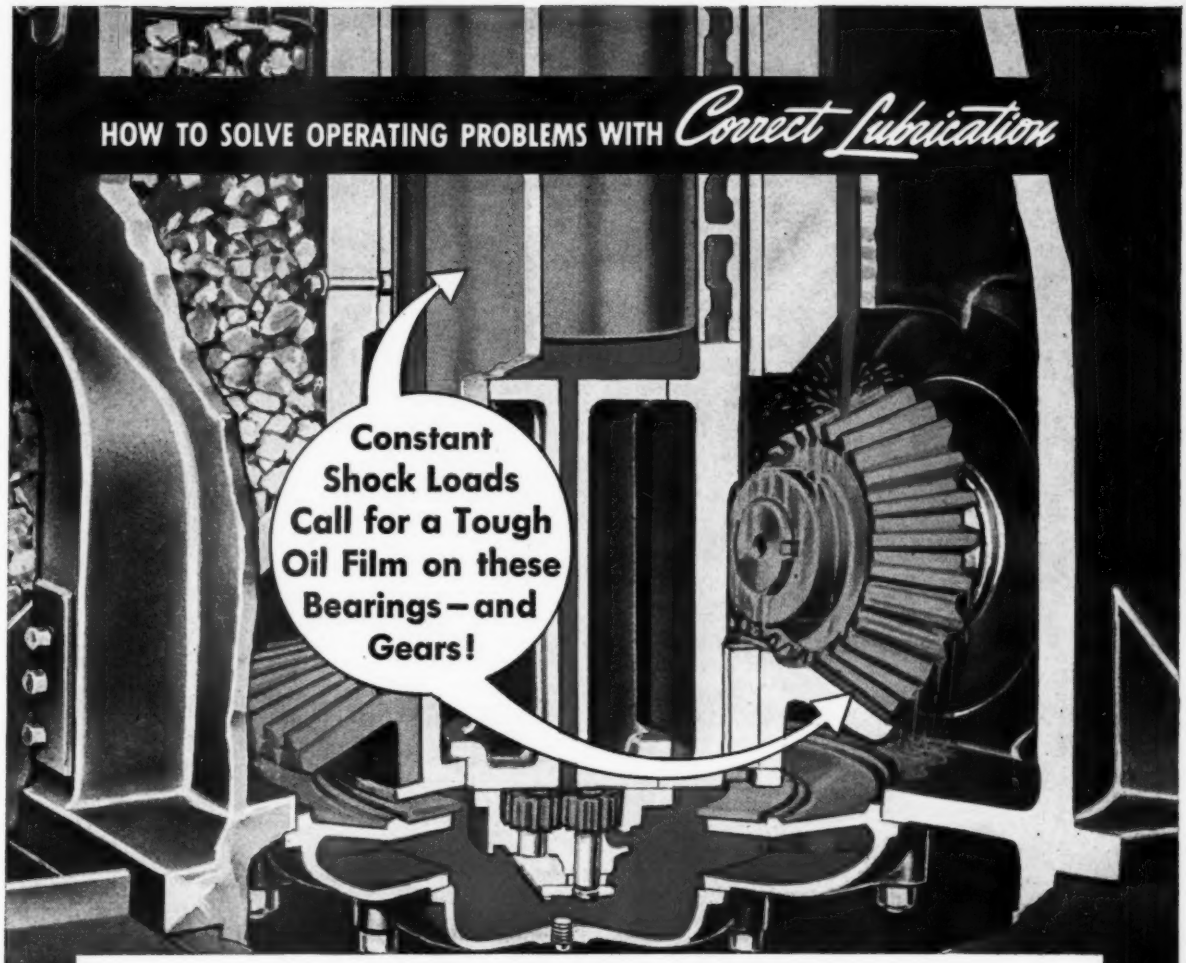
The State of Maine has postwar highway projects of $4,942,370 "ready to go" when manpower and materials are available, according to Harry B. O'Brien, State Postwar Planning Director. The program includes a streamlined turnpike from Kittery to Fort Kent.

Tractor-mounted Cranes and Shovels Shipped

The number of tractor-mounted cranes and shovels shipped in 1943 totaled 4,756, almost three times as many as were shipped in 1941 and nearly 13 times as many as were shipped in 1937, the War Production Board reported.

Unfilled orders rose from 2,516 in the fourth quarter, 1942, to 7,524 in the third quarter, 1943. They then declined

HOW TO SOLVE OPERATING PROBLEMS WITH *Correct Lubrication*



Cushion the Shocks

IN YOUR CRUSHER!

THINK of the terrific shock loads that your crushing operation imposes on bearings and gears! And then think of the kind of oil you need to protect those metal parts!

You can count on Gargoyle Vactra Oils for this job. Proved in crushers all over the world, these high-quality oils form *strong, persistent* films that resist rupture under severe pressures. Moreover, they flow freely at low temperatures to permit easy starting even in the coldest weather.

You reduce wear, shutdowns and maintenance costs to an absolute minimum. You're assured of *more continuous production* the year 'round. See your Socony-Vacuum representative for these oils.

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Lubricants

SOCONY-VACUUM OIL CO., INC., Standard Oil of N. Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. • White Eagle Div. • Wadhams Div. • Magnolia Petroleum Company • General Petroleum Corporation of California.

CALL IN SOCONY-VACUUM

to 7,420 in the fourth quarter, 1943, and to 6,667 in the first quarter, 1944.

Tractor-mounted cranes accounted for the major part of total shipments last year, reversing the pattern of pre-war days when more shovels than cranes were produced.

Cranes are lifting devices, operating on swing or fixed booms attached to the front or side of a tractor. They are used for lifting and moving loads up to 10 tons, depending on the size of the tractor. The cranes are employed principally in combat operations, logging, mining and construction.

Shovels are buckets or scoop attachments at the front of a tractor, capable of handling a variety of materials. They are used in combat areas for digging, loading and leveling. They also have many uses in construction work, mining and in industrial plants.

Shipments of cranes and shovels since 1937:

Year	Number
1937	380
1938	314
1939	541
1940	800
1941	1,650
1942	(Figure unavailable)
1943	4,756
1st Quarter, 1944	1,779

Shipments by quarters since the fourth quarter, 1942, follow: 1942, fourth quarter, 596; 1943, first quarter, 896; 1943, second quarter, 1,255; 1943, third quarter, 1,115; 1943, fourth quarter, 1,490; 1944, first quarter, 1,779.

First Ore Shipped from Steep Rock Iron Mine

The first shipment of ore from the open pit mine of Steep Rock Iron Mines, Ltd., near Atikokan, Ontario, Canada, was made October 3rd. It was carried on the new spur line of the Canadian National Railways to a smelting company in Cleveland, Ohio.

Ore production started a year and a half after operations of draining a lake was started, half the time expected to get the mine into production.

Sand, Gravel Production Drops 23% from 1943

After increasing almost continuously during the previous nine years, production of sand and gravel in 1943 declined 23 per cent below the record established in 1942, according to figures released by the Bureau of Mines, United States Department of the Interior. As over 90 per cent of the output of the sand and gravel industry is used in construction, many plants experienced drastic reductions in volume as projects in their vicinities were completed. On the other hand the industrial sands, having essential functions in a wide variety of manufacturing processes, attained a new record. Production of sand and gravel totaled 234,064,000 short tons valued at $152,793,000 in 1943 and 304,346,000 tons valued at $188,500,000 in 1942. Approximately 75 per cent of the output was supplied by commercial plants and 25 per cent by contractors and constructions or highway maintenance crews employed by Federal, State, county and municipal governments.

Commercial producers reported 176,469,256 tons in 1943, 24 per cent less than the 232,947,787 tons sold in 1942. Average value increased from 68 to 72 cents per ton. Most of the output of the commercial plants is used in building and paving or as railroad ballast. This tonnage declined 27 per cent from 211,687,165 tons in 1942 to 155,250,578 in 1943.

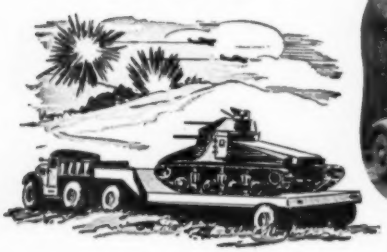
Cuthbert is Engineer-Director

A. C. Cuthbert was recently appointed engineer-director by the board of directors of the County Road Association of Michigan.

Road of War for Travels of Peace

A road of war for the travels of peace, stretching from Bolling Field, D. C., to Camp Springs Air Base, Maryland, is under construction now and will provide another link in the National Capital's metropolitan postwar highway network. Started this Spring by the Public Roads Administration, at

YOUR PEACETIME JAHN TRAILER WILL BE BETTER BECAUSE OF BATTLEFRONT PROVING GROUNDS



Any Axle or Wheel Combination

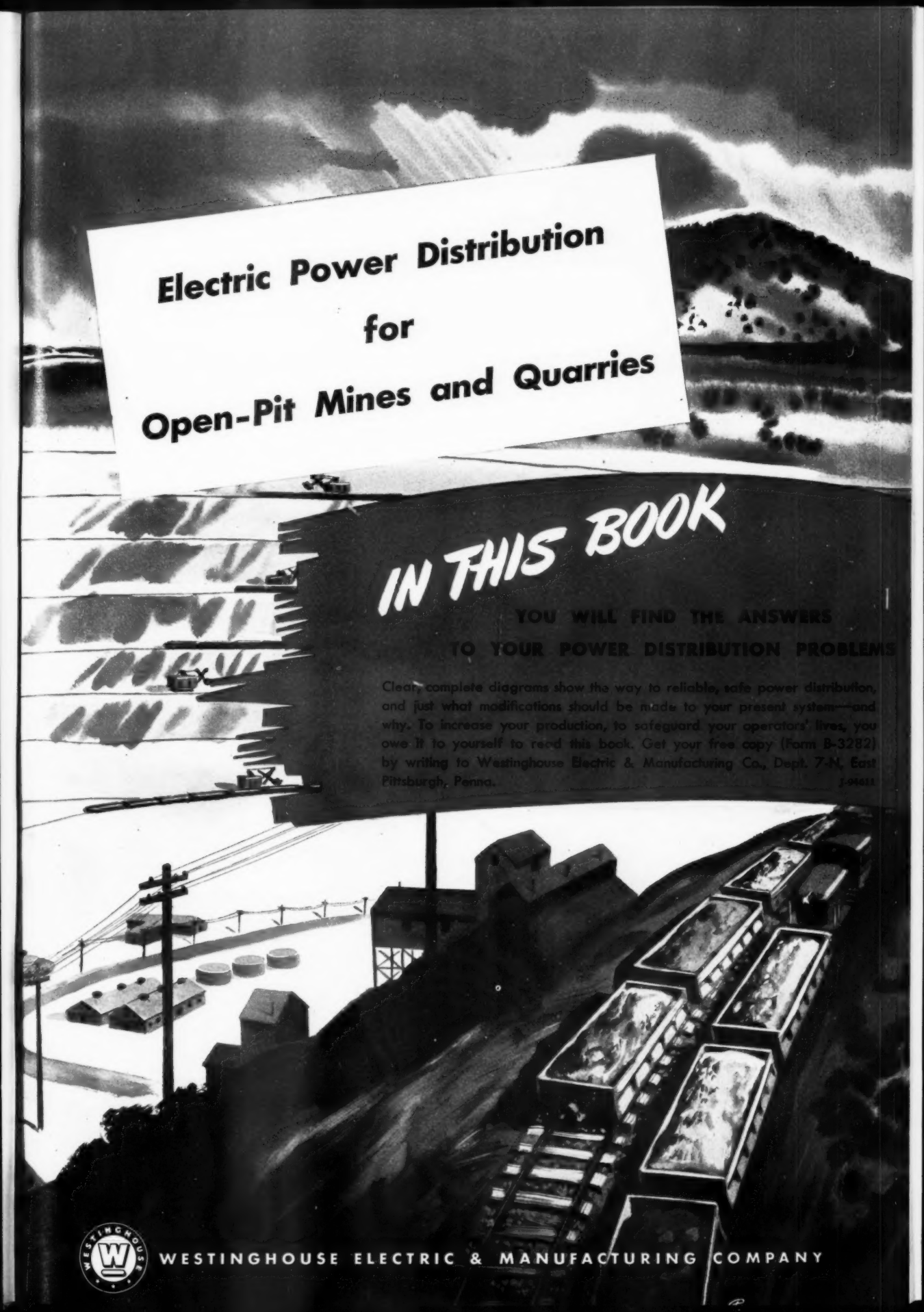
DAY AFTER DAY, hundreds of Jahn trailers are speeding the movement of tractors, bulldozers, power shovels, tanks, and many other heavy pieces of war equipment on battlefronts all over the world. They are building up a store of experience that will mean even more payload per pound of peacetime trailer.

Deep, wide flange beams, multiple oscillating type rear axles which provide equal distribution of load over all tires, heavy bearings, springs and wheels enable Jahn trailers to stand up under heavy road shocks and carry occasional overloads. Hydraulic brakes, now available, provide faster, smoother braking action and greater safety.

JAHN Heavy Duty TRAILERS
Capacities from 5 to 100 TONS

"Come to Trailer Headquarters"

C. R. JAHN COMPANY
1349 WEST 37th PLACE • CHICAGO, ILLINOIS


Electric Power Distribution
for
Open-Pit Mines and Quarries
IN THIS BOOK
YOU WILL FIND THE ANSWERS
TO YOUR POWER DISTRIBUTION PROBLEMS
Clear, complete diagrams show the way to reliable, safe power distribution, and just what modifications should be made to your present system—and why. To increase your production, to safeguard your operators' lives, you owe it to yourself to read this book. Get your free copy (Form B-3282) by writing to Westinghouse Electric & Manufacturing Co., Dept. 7-N, East Pittsburgh, Penna.
J-94611
WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

• Bucyrus-Erie 15-B unloads landing mats in Italy. These mats are used to facilitate movement of heavy equipment over soft terrain. Machines are painted to blend with natural elements.

the request of the War Department, two lanes of the 9½-mile "military road" will be ready for traffic in October and will be open for civilian use as soon as the first two lanes are completed. At present the highway is graded for two 24-foot lanes separated by a dividing strip varying in width from 6 to 200 feet.

Butler Brothers Observe 50th Business Anniversary

Butler Brothers, one of the largest independent producers of iron ore in America and the first company in the iron mining industry to modernize old ways, adopt new ideas and put them in practice, is observing its Golden Anniversary this year. In "Commemoration of 50 years of Adventure in Business" the company issued a Golden Anniversary edition of The Butler Miner, company publication, from which the following information was obtained.

The history of Butler Brothers is the sum total of the personal histories of six brothers, sons of Patrick Butler who came to America from Ireland in 1848 to seek his fortune. Patrick Butler's six sons (he also had two daughters), Walter, John, William, Pierce, Cooley and Emmett launched upon their respective careers about the same time. Pierce graduated from Carleton College in 1886 and went to St. Paul and "read law" in the office of an attorney. He was admitted to the bar in 1888, a year after his brothers had undertaken their first big construction contract, Macalester College. Pierce Butler rose steadily in his profession and in 1923 was appointed Associate Justice of the U. S. Supreme Court on which he served until his death in 1939. He was counsel for the brothers' company from 1894 to 1923.

Walter was the first of the Butler brothers to answer the call of the construction industry which in 1880 was expanding rapidly in the Northwest and was calling for men. William followed Walter a few years later and Cooley joined them and a partnership was formed in 1887. About a year later John and Emmett joined the other three brothers and the team began to make itself felt in the building industry. At first their jobs were small and when things were slack and there were no contracts to be had they would hire out to larger contractors. In 1894 Butler brothers incorporated, with Mike P. Ryan and John Jagger buying interests. These latter two sold their shares to the brothers later.

Their reputation for ingenuity and hard work spread rapidly because they could see no reason for doing a job in the old standard fashion if a new and better way could be found. For example, they early saw the limitations of the old-fashioned hod carrier and to dispense with this slow arduous work the boys rigged up an old steam hoist to a rough elevator that swiftly and easily carried men and materials to the working places. The effect was the immediate lowering of construction costs and the possibility of erecting much higher buildings. Another innovation introduced by the Butler brothers was the cutting of building stone to its size in its native quarry instead of on the job as was the common practice. This was an application of the long-forgotten custom of the Italian stone masons.

After years of success in the building construction field the industry began to slaken off at the turn of the century and a new field of endeavor, mining, was opening up in the wilderness of Minnesota.

In 1902 John Butler went to the comparative wilderness that was the Mesabi Range to strip the Leetonia and Cyprus Mines. He probably did not know at that time that he was shaping the future destiny of Butler Brothers.

Butler Brothers became increasingly interested in the new field of open pit mining on a large scale. The first contracts were let to the brothers by mining companies to develop some of their properties. John, who was later

(Continued on page 658)

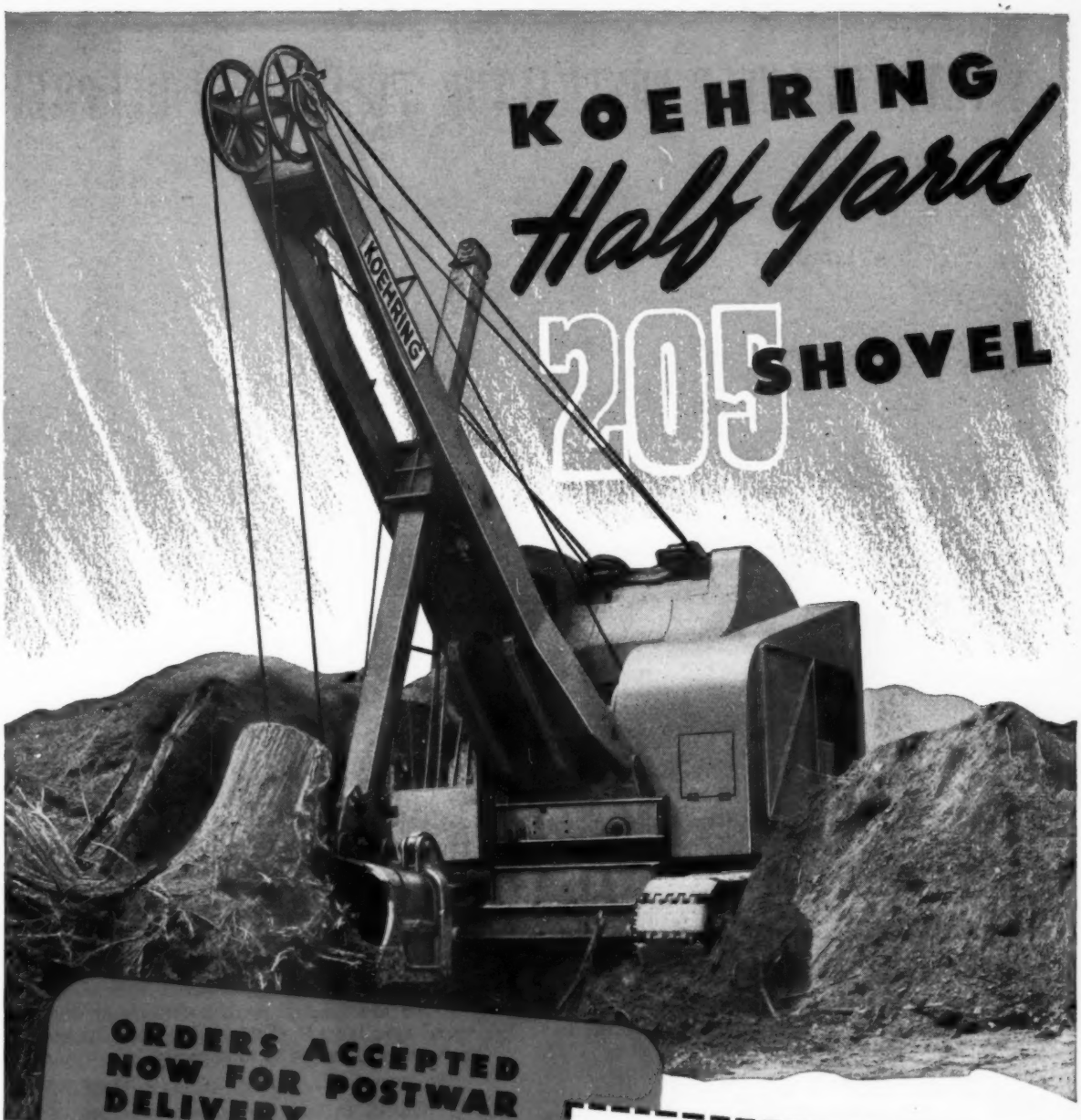
EXPERIENCE builds 'em PERFORMANCE tells 'em

AMERICA'S shipbuilding industry will launch more ships in 1943 than all the rest of the world combined.
ROGERS TRAILERS are a vital link in the mass-production method of ship construction for they are transporting heavy machinery . . . boilers, bulkheads, engines . . speeding Victory ships down to the sea!

on ROGERS TRAILERS

ROGERS TRAILERS are serving efficiently on the home-front too and new models which will be available when war contracts are completed, will be even more efficient than the multitude which have been so successfully operated by industry for many years.

ROGERS BROS. CORPORATION
ALBION,
PENNA.



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ORDERS ACCEPTED NOW FOR POSTWAR DELIVERY

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KOEHRING COMPANY, Dept. X,
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Please send New 205 Shovel Bulletin

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Individual Name_____ Title_____

Street Address_____

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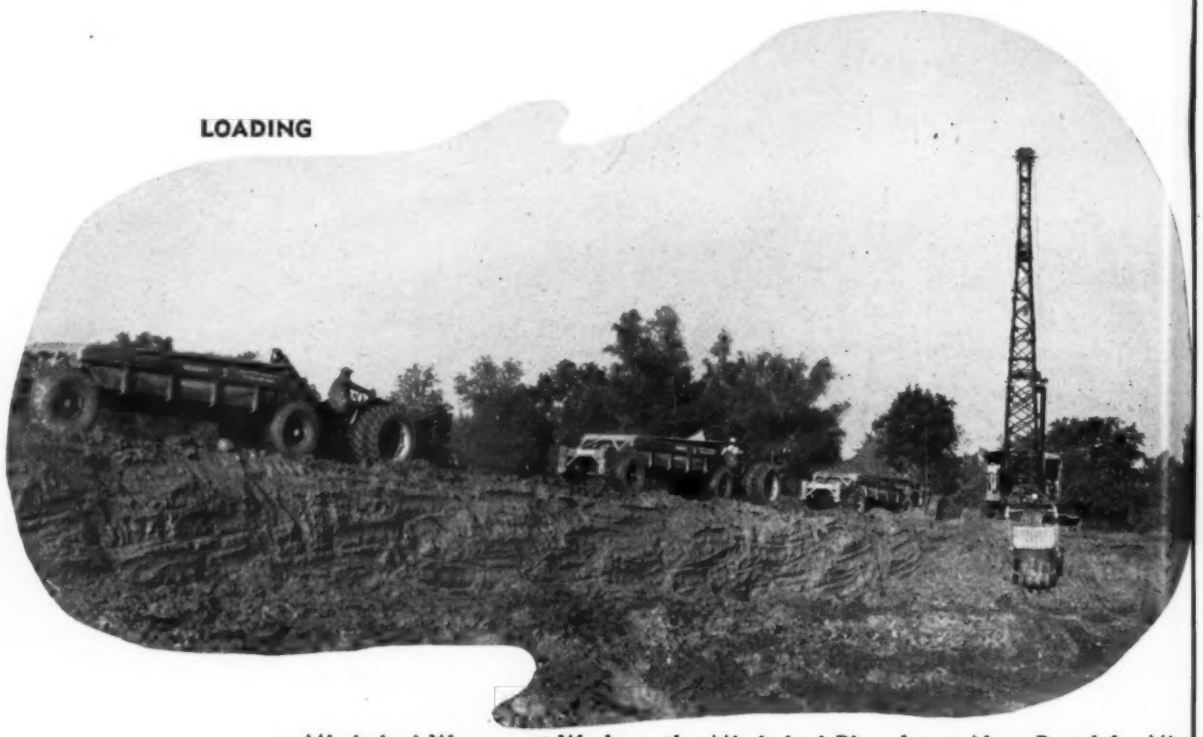
KOEHRING HEAVY DUTY

ARMY E NAVY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

A VETERAN LEVEE CONTRACTOR TELLS WHY HE PREFERS MI



Mississippi Wagons at Work on the Mississippi River Levee Near Rosedale, Miss.

"THE NICEST OPERATING EQUIPMENT I'VE EVER HAD THE PLEASURE OF BEING AROUND" . . . SAYS T. H. STOUT CLEVELAND, MISS., CONTRACTOR

Mr. T. H. Stout, of the Stout & McDearman Construction Company, Cleveland, Miss., has been in the contracting business since 1927, chiefly on the treacherous Mississippi River levee. After starting his current levee jobs with ten hauling units of the conventional type, he purchased seven MISSISSIPPI WAGONS to complete the task.

Here are some of Mr. Stout's statements with reference to the detailed performance of MISSISSIPPI WAGONS on their 930,000 yard levee jobs:

"Our seven MISSISSIPPI WAGONS have enabled us to haul much more dirt and at the same time reduce our direct expenses $600 per week, largely due to these facts:

"The seven MISSISSIPPI WAGONS are using only 62 gallons of motor oil every 161 hours, including two oil changes.

"MISSISSIPPI WAGONS are using 35 per cent less Diesel fuel per unit, holding fuel cost to a minimum.

"We are loading with a three and one-half yard dragline and it takes three full buckets to load one of the units to capacity.

"It requires only six of our MISSISSIPPI WAGONS to take the capacity output of our three and one-half yard dragline on the longest hauls.

"MISSISSIPPI WAGONS are snappy, speedy. Our haul averages 5000 feet round trip, including climbing to the top of the levee loaded. A MISSISSIPPI WAGON makes a complete round trip every 6½ minutes, with one minute loading time.

"Repair costs are so extremely low, there can be no doubt the amount necessary to keep them in good repair will be exceedingly small.

"MISSISSIPPI WAGONS have proper flotation, and this, together with their proper weight distribution, eliminates excessive cutting up of haul roads, saving at least 40 per cent in haul road maintenance."

MISSISSIPPI WAGONS

HAULING

DUMPING

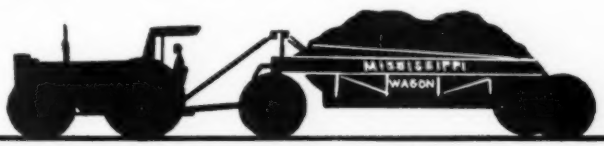
SPECIALLY RECOMMENDS MISSISSIPPI WAGONS BECAUSE:

1. The low first cost.
2. Exceedingly low repair costs.
3. The great advantage given them by the weight transferring feature, enabling the operator to get the traction needed during bad going, but not making the tractor pay the penalty of the pounding and surging of the loaded trailer during the high speed portion of the cycle.
4. It's impossible for large chunks of gumbo dirt to wedge in the body, due to the fact the side walls are straight up and down.
5. The speed and snappy performance of MISSISSIPPI WAGONS which enables a contractor to get a job done in the shortest possible time.
6. The operator is assured comfort by the low pressure used in the tractor drive tires and the very comfortable seat equipped with a shock absorber.
7. The operator's safety is assured by: (a) the excellent brakes on the tractor and trailer; (b) the low center of gravity permits operating on steep levees without turning over. These features are most important in our operation as levee work is always on rough slopes of various degrees.
8. And finally, the low cost of repair parts when repairs are necessary. The entire transmission parts cost only $195.54; the working parts of the entire rear axle and differential cost only $172.33.

M-R-S Manufacturing Company takes pride in adding another satisfied customer using MISSISSIPPI WAGONS to its list. You can get ready now for that tough postwar period by purchasing MISSISSIPPI WAGONS —

"the world's most modern hauling units."

Contact your nearest International Industrial Power distributor or write us for complete details.



MRS MANUFACTURING CO.
JACKSON, MISSISSIPPI

Shots from the Firing Line

(Continued from page 654)

joined by Emmett and Cooley, undertook the job of stripping and developing these mines and Walter continued as president of the corporation.

The Leetonia and Cyprus Mines, lying adjacent to each other, were the first operations to get under way. They were started in August, 1902. John, a firm believer in standard gauge railway equipment, replaced the three narrow gauge dinkies with three standard gauge locomotives. In his second year of operation he purchased the biggest shovel to be seen at the time on the Range, a 75-ton Bucyrus. The change-over to standard gauge equipment in the Leetonia Mine was completed in 1904, a year after the transformation was completed in the Cyprus Mine. Thus Butler Brothers added another "first" to the history of their operation.

• Bucyrus-Erie Dozershovel cuts trail through ridge at Marine Camp Pendleton.

In 1908 a contract was obtained to strip the La Rue, an underground property at Nashwauk and the Butler Brothers made their first entry into the area that has been their headquarters ever since.

In the Spring of 1908 Emmett Butler came to the Mesabi Range to help his brothers by taking over the supervision of the Silver Mine near Virginia. In 1909 the Grant Mine at Buhl was opened and John supervised all operations and was assisted by Emmett who by that time had the Silver Mine well under way.

In 1910 the Leetonia and Cyprus operations terminated and the equipment was moved to Buhl where new and larger shop buildings were erected. By 1910 the first stripping contract on the La Rue was also being completed and so some of the men and equipment from this mine were also moved to the Grant Mine at Buhl.

In 1911 Butler Brothers was given a contract to strip the Longyear Mine near Hibbing. The Longyear location was purchased by the Company as residences for the miners employed there.

As the years passed Butler Brothers' reputation as strippers grew considerably and by 1913 the stripping of the Smith Mine, west of Hibbing, the Dean Mine at Buhl, the Morrow Mine at Eveleth, and the Bennett Mine at Keewatin had been added to their Mesabi operations.

Contracts for the stripping of the Plymouth and Wakefield Mines on the Gogebic Range in Michigan were taken in 1913 and 1914, respectively. It was at this time that Cooley was called back from the East where Butler Brothers were operating their construction business, to manage the work in Michigan. When this work was completed Cooley joined John and Emmett on the Mesabi Range.

Meanwhile in 1913, Butler Brothers took out their first leases; the Quinn, the Harrison, and the North Harrison Mines in the Nashwauk area of the Mesabi Range. In 1914 Butler Brothers' first shipment of ore was made, the Quinn and Harrison together producing 206,080 tons.

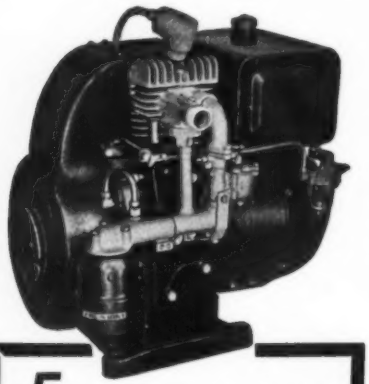
After the change-over from contractors to mine operators took place, only four other stripping projects were undertaken by Butler Brothers. These were the Mace Mine in 1915; the Majorca, near Calumet, in 1916; the Judd at Taconite in 1920, and additional stripping of the Mahnomen Mine in 1928-29.

More leases were acquired and a second concentrator, the Patrick, was built in 1917. The first concentrator, the Harrison, was built in 1914.

Walter Butler, who had served as president of the firm since its incorporation, decided to return to the field of construction. He retired from Butler Brothers in 1927 to supervise the Walter Butler Company, Inc., which he formed in 1924.

Cooley Butlers' interest in mining took him to California in 1920 and he made his home there. He retained his interest in iron mining and succeeded Walter as president of Butler Brothers in 1927. In 1936 he became chairman of the board of directors and Emmett Cooley became president.

In 1914 Butler Brothers moved 986,614 cubic yards of material with steam shovels and locomotives and last



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POWER AND LIGHT FOR EVERY NEED

TYPICAL DIESEL LUBRICATION PROBLEMS:

5. Liner Wear

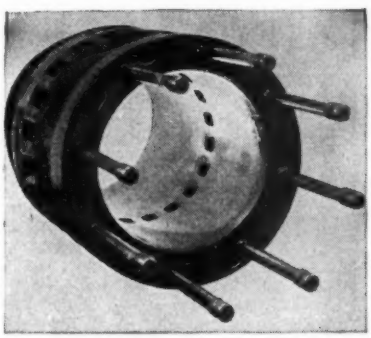
Wear on Diesel liners is commonly concentrated in the high-temperature belt near the combustion chamber. This is largely attributable to the inherent inability of most lubricating oils to "wet" hot metal surfaces.

Unlike spark ignition engines in which a partial vacuum in the combustion space during the intake stroke assists in drawing oil toward the upper compression rings, Diesels operate at or above atmospheric pressure in the combustion space which tends to drive oil away from the rings.

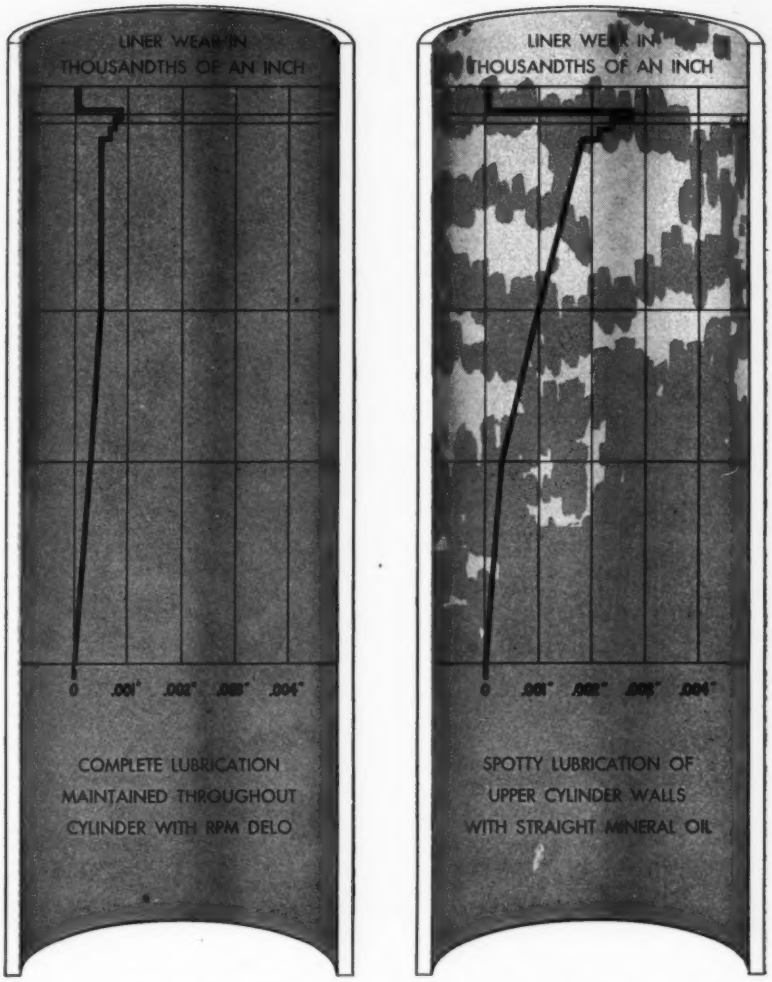
It is imperative then—to prevent relatively dry operation in the top piston ring high-temperature area—for the lubricant to have high-temperature adhesion characteristics.

To achieve this high adhesion factor under all operating conditions in RPM DELO Diesel Engine Lubricating Oil, a special compounding material was added. With this additive, RPM DELO will not run away from hot surfaces, thus preventing metal-to-metal contact on hot-running engine parts.

A typical example of the effectiveness of RPM DELO in preventing liner wear is offered by the Chicago, Rock Island and Pacific Railroad. One of its "Rocket"



Liner from Rock Island "Rocket" engine showing wear of only .001 in. after 157,076 miles on RPM DELO without an oil change.


LINER WEAR IN THOUSANDTHS OF AN INCH
0 .001" .002" .003" .004"
COMPLETE LUBRICATION MAINTAINED THROUGHOUT CYLINDER WITH RPM DELO
LINER WEAR IN THOUSANDTHS OF AN INCH
0 .001" .002" .003" .004"
SPOTTY LUBRICATION OF UPPER CYLINDER WALLS WITH STRAIGHT MINERAL OIL

These charts of one of the tests required by the Army in certifying oil for use in combat equipment, graphically illustrate (right) marked increase of liner wear in upper cylinder zone due to inability of straight mineral oil to provide full lubrication of this high-temperature area; and (left) reduction of liner wear by ability of RPM DELO to stick to these hot spots.

Diesel powered locomotives ran 157,076 miles on RPM DELO without an oil change, with liner wear of only .001 in.

Other causes of liner wear minimized by RPM DELO include:

1. Corrosion caused by carbonic and other acids at low temperatures.
2. Scuffing of liners from rocking of piston rings in worn grooves.
3. Scoring and scratching of liners due to stuck piston rings.

Reducing liner wear to a remarkable degree is but one of RPM DELO's advantages in solving Diesel engine maintenance problems. Its other properties include: The ability of RPM DELO to eliminate ring sticking, to stop excessive deposits on rings and ports, and to prevent bearing corrosion.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (concentrate). Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity.

RPM DELO

Write on your letterhead for free booklet on RPM DELO, *Standard of California, Dept. T-12, San Francisco, California*

STANDARD OF CALIFORNIA

• Cutting down grades like is being done on this California road is scheduled in many state highway department post-war plans.

year 9,504,336 cubic yards of material were moved to make possible present day ore shipments. Of the many properties that produced under Butler Brothers, the following 28 mines are in operation today, or held in reserve:

Mesabi Range

Barbara	Mace No. 2
David	Patrick-Ann
Harrison	South Agnew
Langdon	Wyman Reserve
N. Harrison Annex	Carol
Snyder	Halobe
Weggum	La Rue
Burrall Reserve	North Harrison
Galbraith	Quinn
Kevin	Theodore

Cuyuna Range

Algoma	Louise
Joan No. 4	Whitmarsh
Merritt No. 2	Hunter
Ferro	Merritt No. 1

Since the first shipments in 1914 total production of iron ore has been 43,467,885 tons.

Since Butler Brothers entered the mining field 30 years ago, there have been many changes in methods and equipment. Today ore moves from the pit of the mine to waiting cars almost as smoothly and constantly as water through a pipe. High speed electric shovels dig out the ore and earth and load it into a continuous procession of enormous, specially built trucks. Giant bulldozers, road scrapers and special equipment are constantly shifting and maintaining roadways, allowing the trucks to follow the progress of the shovels. In advance of the digging, electrically powered drills test the soils and formations. Explosives do a share of the preliminary work.

The giant loading shovels, long traveling belts, the big treating plants and many smoothly operating machines, all familiar sights on "The Range" are some of the results of the highly skilled engineering work that have helped greatly to make iron and steel possible at a low cost. The Butler share in this mechanized modernization has been that of the true pioneer, disregarding precedent and established customs and always ready to junk the old for something new and better.

Emmett Butler, on his 70th birthday in 1940, passed the reins of Butler Brothers to his sons and the sons of his brother, Pierce. These sons are Pierce Butler, eldest son of the late Supreme Court Justice, secretary and director; Hazen E. Butler, eldest son of Emmett, vice-president; Francis D. Butler, law partner of his brother, Pierce, vice-president and director on leave of absence since March, 1942, serving as a Lt. Col. in the Army Air Corps, and Patrick Butler, Emmett's second son, vice-president and director. They, and the young-minded managers who work with them, are carrying on their father's work — and Butler Brothers retains its position as leading operator in the iron ore industry.

Elect Martin Head of A.G.C. of Carolinas

Ben H. Martin of Easley, S. C., was elected president of the Carolinas branch of the Associated General Contractors of America during its two-day meeting which concluded October 31 at Pinehurst, N. C. He succeeds C. P. Street of Charlotte, N. C., who was named an ex-officio member of the board of directors.

Edwin L. Jones of Charlotte was elected vice president, and Robert H. Pinnix of Gastonia, N. C., was named treasurer. Elected to the board were N. K. Dickerson, Jr., Monroe, N. C.; George W. Kane, Roxboro, N. C.; D. W. Winkelman, South Pines, N. C.; and C. P. Ballenger, Jr., W. T. Potter and Frank P. Morris, all of Greenville, S. C.

Importance of speeded planning for postwar construction was emphasized by the three principal speakers—William E. Muirhead of Durham and H. E. Foreman of Washington, president and managing director, respectively, of the Associated General Contractors of

Snow goes FAST!
Here's why:
Pick action of revolving propeller breaks up frozen piles.
Digs and loads 10 yds. per min.
Crowd up to 22 ft. per min.
Clutches and gears in oil bath cannot freeze.
Haiss Loaders load fast for more years too. Haiss engineering sees to that. Write for catalogs, prices, deliveries.
HAISS SNOW LOADERS
GEORGE HAISS MANUFACTURING CO., INC., 144th ST. & PARK AVE., NEW YORK 51, N. Y.

• Bucyrus-Erie ¾-cu. yd. dragline loading coral from finger piers in the Solomon Islands for the Naval Construction Battalion.
Official U. S. Navy Photo.

America, and Hal H. Hale of Washington, executive secretary of the American Association of State Highway Officials.

Wisconsin Ore Output Heavy

Wisconsin mineral production for 1943 reached its highest peak since 1929, with $18,925,000 worth of minerals, the Bureau of Mines has announced.

The leading minerals were stone, valued at more than $7,000,000; iron ore, $3,822,000; zinc, $3,108,000, and sand and gravel, $2,596,000.

The state ranked fourth in the nation in tonnages of iron ore producing 1,392,173 long tons and was exceeded only by Minnesota, Michigan and Alabama. It was sixth in the dollar value of iron ore, however, New York and Pennsylvania following the three other states named.

• International military type 6-wheel drive truck is used by Marines to remove Japanese bombs from a blockhouse after the capture of Namur Island in the Marshalls.
Official U. S. Marine Corps Photo

Favor Federal Funds for Urban Highway Construction

A resolution favoring the ear-marking of Federal Aid Highway funds in part for urban construction and acquisition of rights-of-way was adopted by the American Municipal Association in annual convention in Chicago, October 25-27. This principal was advocated earlier by the American Association of State Highway Officials and is contained in postwar legislation pending in the House of Representatives.

States Vote on Diversion Proposals at Election

An amendment to their constitution requiring that all special motor taxes be spent solely for highway purposes was approved by Washington state voters on November 7th. This brings to 16 the number of states with such amendments. A similar proposal voted upon in Nebraska failed adoption.

A.G.C. Discuss Problems of Postwar Era

A general coverage of probable developments affecting the construction industry in the reconversion and postwar periods was made at the fall meeting of the governing and advisory boards of the Associated General Contractors of America in Chicago, November 28th and 29th. Particular emphasis was placed on the necessity for getting construction programs under way during the transition from war to normal peacetime operations.

Residual Fuel Oil Is Released for Roads

Residual fuel oil may be used again for road building and maintenance operations in all parts of the country except the West Coast States, Deputy Petroleum Administrator Ralph K. Davies announced.

Action permitting these uses of residual oil was taken by amending Directive 72, which prohibited the use of road oil as a paving material or dust pallative anywhere in the continental United States. The amendment is effective immediately.

Commenting on the amendment, Davies said:

"Road oil is used mostly from April through September when the demand for residual oil for other purposes is lightest. Restrictions on the use of road oil were lifted at this time, however, so that State and municipal bodies may plan next year's road-building programs now, while refineries can program their production of residual oil."

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PORTABLE AggreMeters
36-YARD
52-YARD
68-YARD
Plan now for post-war. Get the complete story on these 3 Erie standard portable storage and weighing AggreMeters
ERIE STEEL CONSTRUCTION CO · ERIE, PA.
AggreMeters · Buckets · Concrete Plants · Traveling Cranes

Field NOTES

Pipe Bending Practice

When you want to bend a large pipe, fill it with dry sand and plug the ends. Heat to a red heat in the localities to be bent and then bend. Be sure that the sand is dry. Where bends are slight, it is often unnecessary to use sand. The object of sand is simply to keep the sides of the pipe from collapsing or to prevent reduction of flow area. If wet sand is used, and if the ends are plugged, the pipe may burst when heated due to the steam pressure generated.

For smaller pipes, instead of sand, resin is good. There is, however, a "right way" and possibly several wrong ways to use resin. An example of a wrong way was recently brought to this writer's attention in which the mechanic filled the pipe with resin, plugged the ends, and heated the pipe at the place where he wanted to bend it. He watched for a "red heat" just as he would had he filled the pipe with sand. The result was—a violent explosion.

To use resin correctly, pour it into the pipe and allow it to cool and harden. As soon as the resin is hard, bend the pipe cold. Don't heat it. Then after the pipe is bent, heat the pipe all over sufficiently to melt and remove the resin. Equal results may be secured by using lead instead of resin.

For bending copper pipes, pitch, resin, parafin wax, lead, babbitt, and even tin are sometimes used, but some of these materials are often objectionable because they adhere stubbornly to the interior of the pipe and are removed with great difficulty. If these materials are left in the pipe they may form restrictions and interfere with flow of fluids. In copper pipes, parafin wax is least likely to adhere. To prevent adherence of soft metals such as lead, tin, or babbitt metal, prepare a "plumber's smudge" which consists of a thin mixture of glue and water —about a half pint—and a tablespoon of lamp black. Boil the mixture, and completely fill the pipe with it. Then promptly empty the pipe. Then thoroughly dry the interior of the pipe by heating. To such a treated interior soft metals, including even solder, will not adhere.

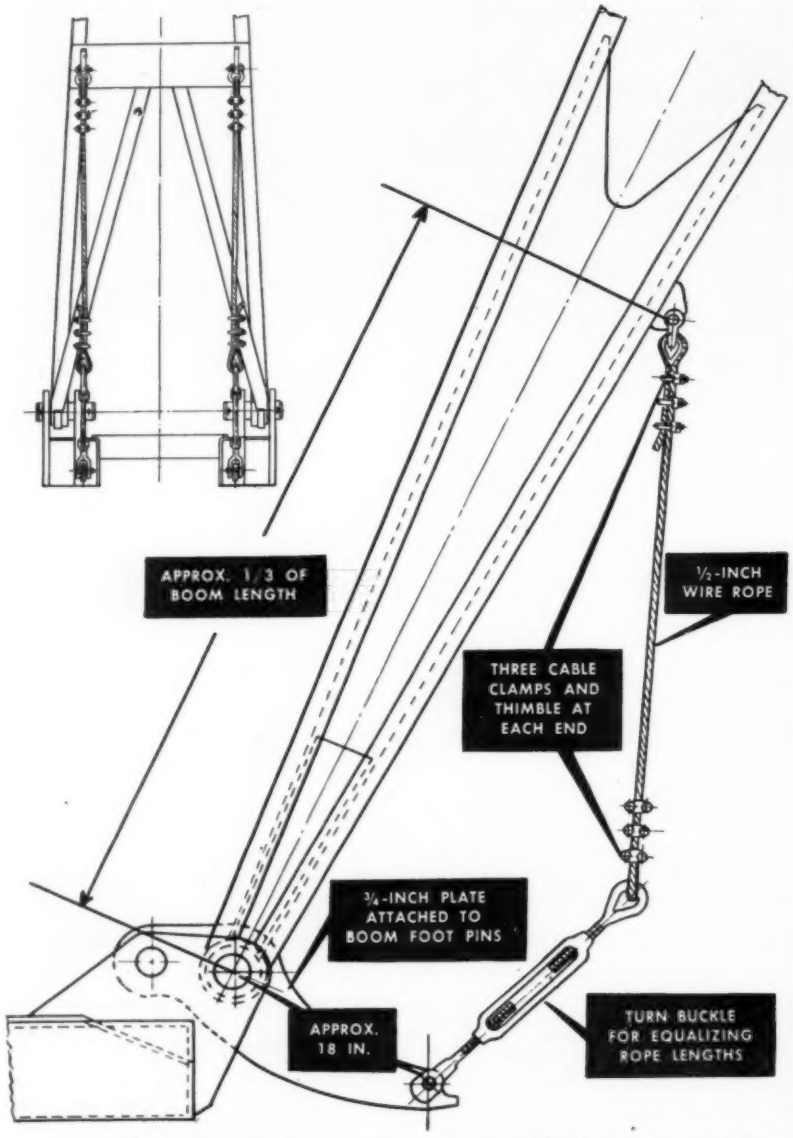
Many excellent mechanical devices are on the market for bending pipe. To bend a large, stiff pipe slightly, and inexpensively, there is nothing handier or more efficient, in this writer's judgment, than a hydraulic pipe bender driven by a hand pump. For large-scale bending, use power drive.

—By W. F. Schaphorst

New Air Compressor Governor

The Army Ordnance Department has secured an inventor's patent for a young Ordnance mechanic who, in his spare time, developed a new way of conserving a piece of automotive field equipment and saving critical gasoline.

The Simpson control governor, named after Sergeant Ernest Simpson of Gettysburg, Pennsylvania, now attached to the 874th Ordnance Com-


APPROX. 1/3 OF BOOM LENGTH
½-INCH WIRE ROPE
THREE CABLE CLAMPS AND THIMBLE AT EACH END
¾-INCH PLATE ATTACHED TO BOOM FOOT PINS
APPROX. 18 IN.
TURN BUCKLE FOR EQUALIZING ROPE LENGTHS

• **The Maintenance Engineer suggests a boom-travel-limiting device designed by the Engineer Board that is guaranteed to do the trick on all machines of 15-ton capacity and less.**

As shown in the above drawings, the boom stop consists of several pieces of ¾-inch plate; lengths of wire rope; thimbles; shackles; cable clamps; and, as a refinement, turnbuckles to permit adjustment of rope lengths. Although two turnbuckles are shown, only one need be used to permit equalization of the loads on the two ropes.

They're Going Overboard For Victory—Are YOU?

USE 8-POINT PLAN FOR AN OVERBOARD DRIVE IN THE 6th WAR LOAN!

NOV. 20th TO DEC. 16th

Our fighting men still have a long way to go! But—your plant-wide selling of the 6th can do much to shorten their embattled miles—lessen the price they so willingly pay for victory! Join the coast to coast parade of patriotic firms that are assuring an **"overboard" showing in the 6th** by following through on **every** point in the 8-Point Plan.

Start the ball rolling by appointing a **6th War Loan Bond Committee**, representing labor, management and other groups.

Carry on by selecting a **Team Captain**—preferably a returned veteran—for every 10 workers.

Right at the start, establish a **Quota** for each department—and every employee.

Arrange frequent **Meetings of Captains**, highlighting importance of their work—effective sales methods—and need for painstaking study of Treasury Booklet, Getting The Order.

6th WAR LOAN

Make definite **Assignments** to those best equipped to arrange music, speeches, rallies, competitive progress boards and meeting schedules.

Issue **Individual Pledge Cards**—made out in the name of each worker and providing for both cash and installment purchase.

Resolicit! This is the secret of "overboard" War Bond subscriptions. Your State Payroll Chairman has a special Resolicitation Plan for you to put into action near the end of the campaign.

Give generously of your **Advertising Space** to drive home the War Bond story.

The Treasury Department acknowledges with appreciation the publication of this message by

Excavating Engineer

★ *This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council* ★

pany at Fort Dix, New Jersey, is a clever device that can be attached to the air compressor units now used in the United States and in all overseas theatres.

The principal function of the device is to reduce the speed of the engine when the compressor is not under load. When attached to a small mobile air compressor, the idling speed of the engine can be reduced 34 per cent, gasoline consumption slashed 15 per cent, and exhaust temperatures decreased 13 per cent.

Used on the large air compressor (16 cubic feet), the idling speed of the engine can be reduced 30 per cent, gasoline consumption cut 11½ per cent, and exhaust temperatures decreased two per cent.

Proving ground tests on the device have been completed at the Ordnance Proving Ground at Aberdeen, Maryland, and the usual field tests will follow.

It is expected that the Simpson control governor will greatly prolong the life of air compressors, reduce maintenance and repairs, and save valuable cargo space that would otherwise be used to transport gasoline.

Sergeant Simpson, a former member of the National Guard, has been in the Army three years. He wears the good conduct and pre-Pearl Harbor ribbons. His invention represents a year's work—from August, 1942, to August, 1943. The Ordnance test was conducted from September to November, 1943, and the patent was issued to Sergeant Simpson in February, 1944.

Front-mounted Winch

The front-mounted winch, which enables a military vehicle to pull itself out of almost any predicament by its own power has proved so successful in action that Gar Wood Industries, Inc., who developed the device in cooperation with Army experts, has shipped more than 150,000 to the armed forces.

Under the method evolved by the company and the Army, the winch is mounted in front of the truck radiator instead of high on the chassis back of the cab as had been the custom. This installation utilizes the full power of the winch without the loss in efficiency characteristic of the old methods of mounting which made it necessary to pass the cable over sheaves in order to obtain forward pulling power.

With the front-mounted winch, the driver of a truck or other military vehicle that is mired down or sunk in shell holes or bomb craters, finds that the job of getting out is relatively easy. All he need do is run out a length of cable, attach it to a tree, large boulder or other available anchor and set the winch in motion. As the drum reels in the steel cable. the vehicle is pulled forward and is soon restored to duty.

Efficiency of Oil Should be Greater than 100%

Impossible as it may sound, it is a fact that it doesn't pay to use a lubricating oil on excavating equipment whose efficiency is not more than 100%.

Here is proof: The formula for efficiency is always, "Efficiency equals output divided by input."

"Input" as applied to lubricating oil is the amount of money "put into" the oil. In other words it is the first cost of the oil.

"Output" is the amount of money earned by the oil.

Thus if $100 is invested in a lubricating oil the input is $100.

If that oil earns only $100, its output is only $100 and the efficiency is only ($100 ÷ $100) = 100%.

It is plain that any oil must MORE than pay for itself for the same reason that any employee must more than earn his salary. An employee who merely "breaks even" for his employer is unprofitable and there is little reason, if any, why he should be kept.

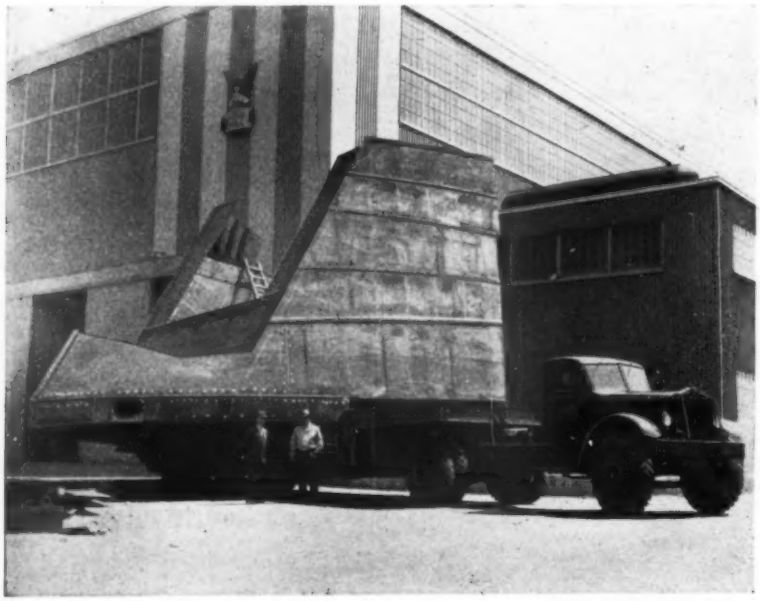
Similarly if an oil merely "breaks even" there is no good reason why that kind of lubricating oil should be used. Use an oil that will more than pay for itself even though its first cost may be greater.

Take for example this instance: a prominent contracting concern was spending $13,380 per year for general bearing and cylinder lubrication. The lubricants used were considered "good" and it was believed that they were paying their way—that they were getting all of the $13,380 per year back out of the oil.

But the concern was progressive and on the alert to do things in a better way—willing to save money in other words. So they decided to give a thorough trial to a lubricant that cost more per gallon and which was reputed to be even better than the oil they were then using.

As a result they saved $3,468 the first year. With operation levels identical the cost of lubricating the machines dropped to $9,912 per year in spite of the fact that the lubricant now being used costs more per gallon.

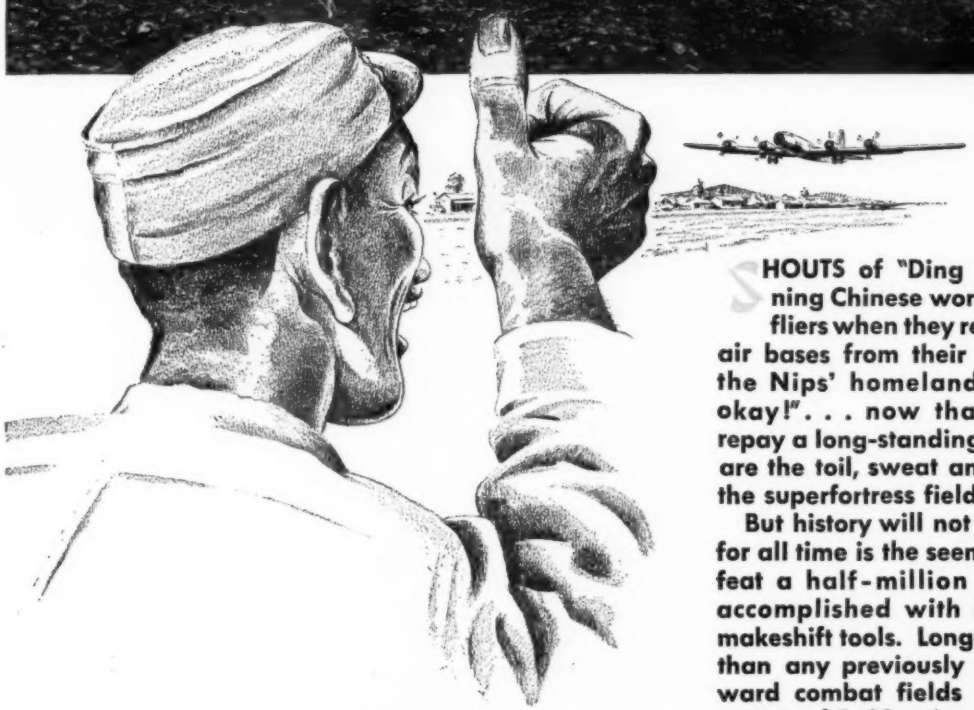
The efficiency of the present lubricant is therefore at least ($13,380 ÷ $9,912) 135 per cent. It is surely obvious that if the first oil was "satisfactory" and "paid its way" the present oil is more than 100% efficient.



Official U.S. Navy Photograph
La Crosse 50 Ton Semi

Buy Bonds Regularly

La Crosse Trailer & Equipment Company
LA CROSSE, WISCONSIN



SHOUTS of "Ding hao!" from grinning Chinese workers greeted B-29 fliers when they returned to China's air bases from their first bombing of the Nips' homeland. "Everything's okay!". . . now that Allied bombs repay a long-standing debt. Forgotten are the toil, sweat and blood put into the superfortress fields.

But history will not forget. Recorded for all time is the seemingly impossible feat a half-million Chinese workers accomplished with bare hands and makeshift tools. Longer and more level than any previously constructed forward combat fields are China's vast system of B-29 strips — "so long that a man at one end of the strip can scarcely distinguish a man at the other."

If only tractors with rollers, bulldozers and scrapers . . . motor graders and other construction tools could have been available!

A main part of the supplies of all Armed Forces, construction machines are being used IN FORCE, in every theater of war, where it is at all possible to ship, fly or truck them. Ingenuity and mass manpower is the only answer to their lack. Fortunately, China had both. We join in paying tribute to a brave nation. To their "Ding hao!" we say "MORE POWER". . . on land as well as in the air . . . and it will come soon!

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

NOT in the *Contract*

The Army psychiatrist at the induction center eyed the prospective new soldier suspiciously.

"What do you do for your social life?" he asked the GI prospect.

"Oh," the man blushed. "I just sit around."

"Hm-m-m, don't you ever go out with the girls?"

"Nope."

"Don't you have any desire to go with girls?"

"Well—sort—of—"

"Then why don't you?" asked the doctor pointedly.

"My wife won't let me."

A female shopper is a woman who can hurry through a department store aisle 18 inches wide without brushing against the piled-up glassware, and then drive home and knock the doors off a 12-foot garage.

"I hear your Uncle Pete died."

"Yeah. When he complained of a backache, the doctor rubbed him with alcohol and Uncle Pete broke his neck trying to lick it off."

"You sold me a car two weeks ago."

"Yes, sir."

"Tell me again all you said about it then. I'm getting discouraged."

Father: "Son, who's the wild woman I hear you're runnin' around with?"

Son: "Aw, pop, she ain't wild; why anybody can pet her."

From the sign on a wall in an Arizona restaurant: "We have an agreement with the First National Bank: They will serve no sandwiches, and we will cash no checks."

". . . and guess where he's got Hitler tattooed on him?"

The things employers have to put up with these days!

The newspapers recently reported the plight of a foreman who found a formerly valuable employee was increasingly disinclined to work. It got so that every time he went to look for him, he'd be out behind the rain barrel, sitting in the sun. Finally, taking the veteran to task, the foreman asked him why he didn't buckle down and get to work.

"Boss," the negligent one replied, "I hear good men are hard to get these days; so I says to myself, 'Look here, fella; you'd better begin takin' care of yourself'."

Doctor: "You must avoid all forms of excitement."

Pvt.: "May I look at them on the street?"

Fan, looking into a telescope: "Gawd."

Friend: "Aw, gwan, it ain't that powerful."

Yeoman: "There's a whole drawer full of old useless documents on file. Shall I burn them?"

Chief Yeoman: "Yes, but make copies first."

"It won't be wrong now," hummed the young bride as she marched down the aisle.

"Good morning, Reverend. I haven't seen you lately."

"No, Captain. I've been busy. Only this morning I married three couples in 15 minutes."

"Fast work, Reverend. That's 12 knots an hour."

Sign in a bar: "In case of a blackout do not leave bar. You may be lit and not know it."

He: "This doctor book says that bathing alone will not keep you healthy."

She: "Well, no matter what it says, I'll continue to bathe alone."

Did you hear about the sailor who broke his arm trying to make a wave in the bathtub?

Judge—"Could the motorist have avoided you?"

Injured man—"He could, your honor. He had the choice of hitting me or the missus and he picked on me."

A scientific development that costs you no more

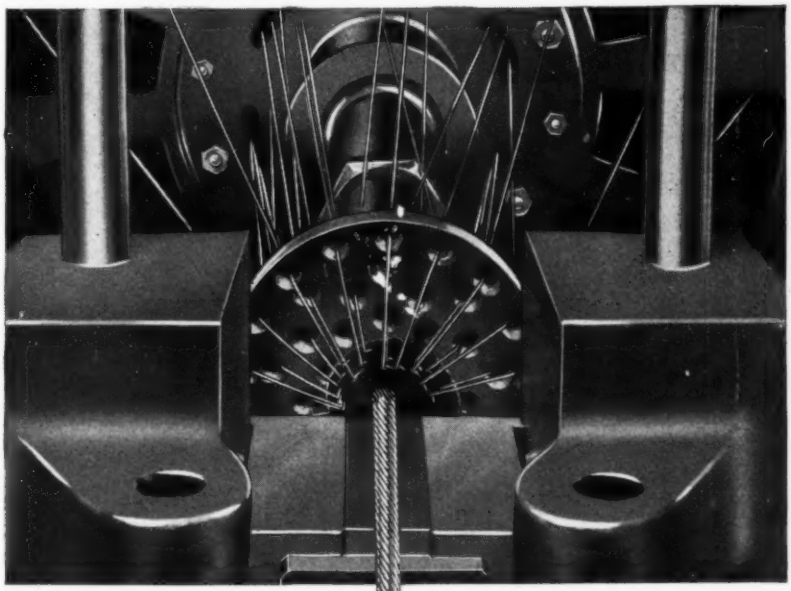
IT'S THE *internal lubrication* IN MACWHYTE PREformed WIRE ROPE

In Macwhyte PREformed Wire Rope, Internal Lubrication increases the life of the rope, thereby reducing operating costs.

A special-formula lubricant made to Macwhyte specifications is force-fed to the wires as they are being closed into the strand.

Macwhyte Internal Lubricant improves the sliding action of the wires as they move in bending around sheaves and drums. In many cases the inside wires are in good condition after the outside wires are seriously worn.

Operators of equipment prefer Macwhyte PREformed Wire Rope because it operates so smoothly and spools on the drum so well.



The above illustration shows how internal lubrication is applied to Macwhyte PREformed ropes. *(Top of stranding die is removed.)* Note the wires pass through the lubricant which is pumped up from below and therefore each wire is completely covered and all spaces between the wires in the strand completely filled.

Macwhyte Wire Rope Lubricant is packed around each wire in all strands of Macwhyte Wire Rope.

If you have a service problem, Macwhyte Wire Rope engineers stand ready to give you the benefit of their experience in selecting the proper size, grade, and construction.

The demands of our armed services are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day so please keep trying to get Macwhyte Wire Rope. We'll serve you if we possibly can.

Rope Conservation Bulletins

18 illustrated articles on the use and care of Wire Rope have been bound into an 8½" x 11" book which is available free to Wire Rope users requesting it on their company letterhead. Ask for Bulletins No. 43-85.

MACWHYTE PREformed WIRE ROPE — Plus — Internal Lubrication — Selected Steels — Tested-Proved

The correct rope for your equipment

MACWHYTE COMPANY

ARMY E NAVY

Wire Rope Manufacturers

2903 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope — MONARCH WHYTE STRAND Wire Rope — MACWHYTE Special Traction Elevator Rope — MACWHYTE Braided Wire Rope Slings — MACWHYTE Aircraft Cables and Tie-Rods — MACWHYTE Stainless Steel Wire Rope — MACWHYTE Monel Metal Wire Rope

Equipment you ought to KNOW ABOUT

For further details about the equipment on these pages please write to the manufacturer, mentioning Excavating Engineer.

Snow Tractor and Trailer

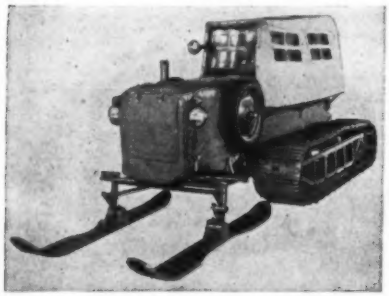
Manufacturer: The Allis-Chalmers Mfg. Co., Milwaukee 14, Wis.

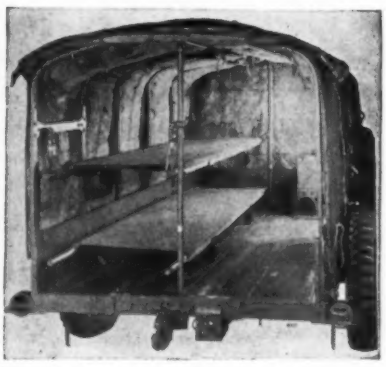
Claims: The Allis-Chalmers Mfg. Co., in cooperation with the U. S. Army Ordnance and Army Air Corps, announces the development and manufacture of a special snow tractor, Model M-7, and a one-ton snow trailer, Model M-19, which are making their appearance regularly in Alaska and the Aleutian Islands with our Armed Forces. Since the front axle can be equipped with either wheels or skis, this two-man snow tractor with trailer is especially suitable and practical for either snow travel or highways. Long, wide tracks with rubber faced shoes spread the tractor's weight and prevent its sinking into the snow, at the same time assuring maximum traction under all conditions.

The tractor is powered with a four-cylinder, four-cycle gasoline engine developing 63 H.P. at 3900 RPM, has six forward and two reverse speeds, ranging from four to 41 miles per hour. Reverse speeds are three to 11 mph., depending upon the speed range employed.

Because of its low center of gravity, the tractor can easily climb slopes that may be as steep as 45 degrees, depending upon the traction available and the load being pulled.

The trailer has a load capacity of one ton; while the unit itself weighs 640 pounds, including the insulated canopy top. Power for lights and body heater is supplied by the tractor.





Oro Manganese Steel Apron Feeder

Manufacturer: Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.

Claims: Kensington Steel Company of Chicago, holders of the patents, authorized the Pioneer Engineering Works, Inc., to build the Oro Manganese Steel Apron Feeder. Among features of this feeder are: all wearing parts including pans, rollers, chain bushings and sprocket teeth are manganese steel; sprockets on both head and tail shafts are built with reversible and renewable teeth made of Oro Manganese Steel.

Sizes range from 30" to 60" wide. Lengths vary from six to 25 feet, depending on the installation. The pitch of the pans is six and nine inches on the smaller feeders, and 12 and 15 inches on larger feeders.

Bucket Pump

Manufacturer: Gray Company, Inc., 60-11th Ave., N.E., Minneapolis.

Claims: "Block Buster" can be used for lubricating trucks, contractor's equipment and industrial machinery. Features include an easy operating double action pump developing 4000 pounds pressure; hardened steel, precision ground piston; simple positive foot valve; 18 gauge seam-welded container with pump support bracket which keeps the pump from being completely removed when filling; and strong carrying handle which acts on a large stud bolt to hold the cover and pump in position in the container. The conical-shaped hopper bottom automatically feeds lubricant to the foot valve.

Portable Electric Hand Searchlight

Manufacturer: U-C Lite Manufacturing Co., Chicago 11, Ill.

Claims: "Big Beam" No. 411 Portable Electric Hand Searchlight will project an intense beam of more than 2,500 ft., or by means of a snap-on lens, give the same volume of light over a wide area. Powered by heavy-duty, shockproof six volt storage battery, rechargeable from any A.C. charger, D.C. line or light plant. Lamp head can be turned in any direction and stays adjusted. Other models available powered by dry-cell batteries.

Side-lift Dozer

Manufacturer: The Buckeye Traction Ditcher Company, Findlay, Ohio.

Claims: This new cable-controlled side-lift bulldozer and Trailbuilder features single king pin mounting of the moldboard and double trunnion tilting. The moldboard can easily be angled to the right or left on the single king pin by removing two landside pins, swinging the blade to the desired side, and replacing the landside pins. The double trunnion mounting makes it possible to tilt either end of the blade 12" by attaching one push arm to the top trunnion on one side while the other arm is mounted on the lower trunnion on the opposite side. The moldboard is fitted with reversible cutting edge and replaceable corner bits.

OUTPUT starts with the BUCKET

In actual service, any dragline is only as good as its bucket. A little more material carried per pass, a little more ability to take the punishment of tough digging can mean the difference between profit or loss on a job, can quickly total more than the difference between the cost of the cheapest bucket and the best.

A 25-cu. yd. Red Arch ready to start for the anthracite coal fields. Its size required special railroad handling.

Red Arch buckets are available in a complete range of sizes from ⅜ cu. yd. capacity up; and in three types, for light, medium and heavy digging. They are scientifically engineered for real performance and long life on a foundation of over 60 years experience in building outstanding excavating equipment. Teeth and sharp cutting edge are set at the angle to give most effective digging action. The high arch permits heaping loads to "flow" in and out of the bucket easily. Body construction combines maximum strength with minimum weight.

Whether your digging is easy or hard, there is a Red Arch bucket that will handle it efficiently. Write for full information. R-T6C

BUCYRUS ERIE

South Milwaukee, Wisconsin

New trade literature

Title: "To Help You Maintain Better Highways"
Subject: A new six-page folder featuring the Athey Force-feed Loader. The folder illustrates time and labor saving methods of removing and salvaging surplus materials on highway maintenance and construction through the use of the new self-propelled Athey Force-Feed Loader.
Where to Get: Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Ill.

Title: "Quarterly Digest of Current Asphalt Literature"
Subject: A condensed resume of the principal articles on asphalt and asphalt paving appearing in current engineering, trade and official periodicals in the United States, Canada and foreign countries during January, February and March, 1944.
Where to Get: The Asphalt Institute, 801 Second Ave., New York 17, N. Y. (Free)

Title: "YM Robot Refiner"
Subject: Bulletin covering new Robot Oil Reclaimer now available from The Youngstown - Miller Company. The Robot employs the process that this company has used in batch oil reclaimers for over 10 years, with the new feature that the operation is now automatic and continuous. Capacities range from four gallons per hour to 300.
Where to Get: Youngstown - Miller Company, Sandusky, Ohio. (Free)

Title: "Design and Construction of Pneumatic Tires"
Subject: Comprehensive manual on design and construction of pneumatic tires published for U. S. Army training schools. Consists of 50 well-illustrated pages and discusses the basic principles of pneumatic tire design, including pictured descriptions of the role which each part of the tire plays in its operation and how tires are manufactured. Measurements and other data on each of the important classifications of heavy duty military and civilian tires, and proposed load and inflation table for them are one of the features of the publication, together with tube, valve, flap and rim data.
Where to Get: B. F. Goodrich Company, Akron, Ohio. (Free)

Title: "The Oxy-Acetylene Handbook"
Subject: This handbook, published by The Linde Air Products Company, fulfills an urgent need for a complete, comprehensive, and authoritative textbook on basic oxy-acetylene welding and cutting procedures. This 600-page manual covers the entire range of the oxy-acetylene process, giving clear, easy-to-follow instructions for handling all the common commercial metals, together with simple explanations of the fundamental principles of the various methods of depositing and controlling molten metal. Considerable space is devoted to an explanation of the operating principles of oxy-acetylene equipment and instructions for its care and maintenance.
Where to Get: The Linde Air Products Company (offices in all important industrial centers) (Price $1.50).

Title: "Driver's Manual"
Subject: A guide to the things a good driver should know, this stiff-covered 158-page book, replete with sketches and photographs, tells the story of recommended driving practices in a practical, easily-understood way. The manual is designed for truck owners, superintendents of fleets and drivers. A compilation of authoritative data based on the experience of thousands of successful drivers, the teachings of authorities throughout the industry, and the findings of company research. The suggestions to drivers are applicable regardless of the make of truck handled.

In addition to chapters on the handling and care of trucks under various conditions, there is a Reference Data section in the back of the book.
Where to Get: The White Motor Company, Cleveland 1, Ohio (Price 40c).

Title: "Technical and Scientific Books"
Subject: A 29-page booklet listing 103 technical books, a review of each, their contents, author, and price in the fields of Chemistry, Engineering, Foods, Formulas and Cosmetics, Gardening, Mathematics, Medicine, Metals and Metal Working, Physics and Science, and Miscellaneous. Feature of the booklet is its index of subjects.
Where to Get: Chemical Publishing Co., Inc., 26 Court Street, Brooklyn 2, N. Y. (Free)

Title: "Complete Bulk Cement Plants"
Subject: A four-page, two-color illustrated pamphlet describing specially engineered cement handling equipment plants.
Where to Get: The C. S. Johnson Company, Champaign, Ill. (Free)

Title: "Postwar Tournapull Story"
Subject: Postwar construction plans for relocating and widening highways, lengthening airports, and building dams show the earthmoving trend is to longer hauls. The big, eight-page pamphlet claims more power and less weight increases Tournapull production, discusses the values of rubber-tired earthmoving equipment, interchangeability of Tournapulls with Carryall scrapers, Tournatrailers, cranes and other units, and contains contractor-named job illustrations.
Where to Get: R. G. LeTourneau, Inc., Peoria, Ill. (Free)

Title: "The Complete Line of Caterpillar Products"
Subject: A new 20-page booklet illustrating the complete line of "Caterpillar" diesel engines, tractors, and road machinery on earthmoving, agriculture, logging, mining, oil field and other power jobs.
Where to Get: Caterpillar Tractor Co., Peoria, Ill. Ask for form D-41. (Free)

Title: "Metallizing Booklets"
Subject: Description of metallizing guns, wires, surface preparing tools and other metallizing accessories given in one booklet. In addition, this booklet informs how sprayed metal coatings are saving critical ma-

HAYWARD
WON'T QUIT
OR CAUSE TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.
BUCKETS

A Time-Saving ACCESSORY
RED ARCH CHAIN
Red Arch incandescent butt-welded dragline chain has twice the strength and wearability of ordinary chain. It will save you extra money because of less shutdown time. You can get any size chain from 5/8" to 2" to fit your bucket.
T34B
BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

terials and man power in production and maintenance of war-needed parts and equipment. Another booklet of 80 pages, profusely illustrated with photographs and diagrams, covers every phase of the metalizing process from surface preparation to spraying technique.

Where to Get: Metallizing Engineering Co., Inc., 3814 30th Street, Long Island City 1, N. Y. ($1.00)

Title: "Building Construction Cost Data"

Subject: This 48-page booklet of tabulated cost data is intended for use in making up engineering estimates on building construction. Useful in checking extras, for converting from cost plus to lump sum and in making preliminary estimates. The 790 items are broken down for labor and material and arranged alphabetically with index tabs.

Where to Get: R. S. Means, 2865 S. Buchanan St., Arlington, Va. (Price, $1.60)

Notes from the manufacturers

Aluminum Company of America of Pittsburgh, Pa., has expanded its sales engineering and development divisions activities with the appointment of three men to head special activities. Frank Jardine, who has been in charge of development work in Cleveland, has been given the title of Manager of Development Division, Cleveland Branch. John R. Willard, has been placed in charge of the Sales Development Division located at New Kensington, Pa., and B. J. Fletcher has been appointed Chief Engineer of the New Kensington Branch. All three will report to R. V. Davies, Assistant General Sales Manager.

Barber-Greene Company of Aurora, Ill., has received its fourth Army-Navy Production Award for outstanding achievement in producing materials essential to the war effort.

The Euclid Road Machinery Co. of Cleveland 17, Ohio, has appointed The G. W. Van Keppel Co. of Kansas City, Mo., as authorized distributor for that territory. G. W. Van Keppel, head of the distributing agency, is 1944 president of Associated Equipment Distributors.

Universal Engineering Corp. of Cedar Rapids, Iowa, appointed D. H. Young of New York City director of exports. He will appoint dealers in countries throughout the world with the exception of Russia, Canada, Mexico, Hawaii and the Philippines, where existing distributors will continue to serve the company.

Gar Wood Industries, Inc., of Detroit, Mich., announces the appointment of Roy Schoonfield as acting manager of the Washington branch to succeed A. E. Heath, who has been assigned other duties with the corporation.

The Frank G. Hough Co. of Libertyville, Ill., has been awarded a white star for its Army-Navy "E" pennant, according to Frank G. Hough, President.

E. I. DuPont de Nemours and Company, Wilmington 98, Delaware, announces the election of Edward B. Yancey as vice-president and a member of the executive committee of the company. William H. Ward succeeds Yancey as general manager of the explosives department.

International Nickel Co., Inc., of New York City announces that H. O. Teeple, chemical engineer, has joined its Development and Research Division to specialize in corrosion problems.

LaPlant-Choate Mfg. Co., Inc., of Cedar Rapids, Iowa, has been awarded its fourth Army - Navy Production Award.

Davey Compressor Company of Kent, Ohio, is in receipt of an "E" pennant with star in recognition of continued outstanding production of its compressors, air-field lighting units, truck power take-offs, and pneumatic saws.

ITS GREATER ENDURANCE MEANS BETTER VALUE . . . Preformed "HERCULES" (Red-Strand) Wire Rope is designed and manufactured to do today's more difficult jobs quicker . . . better . . . safer . . . more economically. Properly selected materials, plus advanced manufacturing methods, plus the specific advantages of the preforming process are the factors which add up to its better value.

What are some of the specific advantages of the preforming process? Actual service records show the following:

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As broken wires lie practically flat, they are not so apt to injure the hands of men handling it. Also, there is less possibility of an "out of place" wire causing damage to adjacent wires in the rope.

2

It is not so easily kinked.

3

Its inert qualities make for smoother spooling.

4

It is easier to splice and faster to install.

5

It is longer lasting.

For consistent top-flight wire rope performance you can rely on "HERCULES." Let the Red Strand be your guide. It is available in both Round Strand and Flattened Strand constructions in either the Preformed or Non-Preformed type. We shall be glad to help you select the right construction for your particular conditions.

Important: Preformed Wire Rope is particularly efficient for use on: Backfillers, Bulldozers, Carryall Scrapers, Cranes, Draglines, Dredges, Dump Wagons, Hoists, Shovels, Skimmers and Trench Hoes.

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A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

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TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

MISCELLANEOUS EQUIPT.

FOR SALE

We own for quick shipment New Kohler 5 K.V.A., 115 V., A.C. Automatic Plants. Used Universal 4 K.W., 110 V., D.C. plants. Used Model D Kohlers.

REPUBLIC ELECTRIC CO.
Davenport, Iowa

FOR SALE

One eight-inch heavy duty Butler, Tell-Tale Sand and Gravel Pump. Extra shafts, impellers and liners. $500.00 Cash. Box 3064

FOR SALE

New 8 cu. yd. Esco Bailing Bucket No. 832 for stockpile work. Back arrangements for Bucyrus-Erie 120-B. Total wgt., 15,300 lbs. Back alteration to fit a 170-B would cost between $600 and $750. Address correspondence to R. R. Little, Supt. of Transportation, Permanente Cement Co., Permanente, Calif.

FOR SALE

Crusher, portable Jefferys Hammermill model 20x30 type A serial No. 1520, 1938 Hercules engine type O No. 25469 35 HP mtd. on solid rubbered trailer $1400.00

RIDGE COAL CO.
Sugarcreek, Ohio

FOR SALE

1—Gas Buda Motor with clutch. 125 H.P. at 1000 RPM. In good condition. Price $1100 f.o.b. loading point.
1—Harding Rod Mill, 4'x8' with V-Belt Drive. In good working condition. Price $1500 f.o.b. loading point, without motor.

Deckers Creek Sand Company
Morgantown, W. Va.

SURPLUS DIPPERS FOR BUCYRUS-ERIE SHOVELS

2—⅝ cu. yd. Skimmer Scoop Dipper—10-B.
2—½ cu. yd. Drag Shovel Dipper—17-B.
3—½ cu. yd. Skimmer Scoop Dipper—17-B.
1—¾ cu. yd. Welded Dipper—21-B.
1—1 cu. yd. Drag Shovel Dipper—29-B.
1—1¼ cu. yd. Cast Front Dipper—GA-3.
1—1¼ cu. yd. Inserted Type Dipper—30-B, 42-B, E-2, 41-B and 43-B.
1—1¼ cu. yd. Drag Shovel Dipper—33-B.
1—1½ cu. yd. Heavy Duty All Cast Dipper—42-B.
1—1½ cu. yd. Snow Loading Dipper—10-B.
1—2 cu. yd. Rock Dipper—75-B.
1—2¼ cu. yd. Inserted Type Dipper—50-B.
1—2¼ cu. yd. Inserted Type—55-B.
1—2¼ cu. yd. Rock Dipper—75-B.
1—2½ cu. yd. All Cast Dipper—55-B.
1—2⅝ cu. yd. Light Duty Shovel Dipper—54-B.
1—3½ cu. yd. Coal Loading Dipper—75-B.
1—4 cu. yd. Type IV Medium Duty Dipper—100-B.

F.O.B. Works

Write for any further information desired.

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee **Wisconsin**

DRAGLINE BUCKET FOR SALE

Bucyrus-Erie 3 cu. yd. Type AY heavy duty dragline bucket complete, almost new, $1500. Box 626 Emporia, Kansas

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FOR SALE

One Allis-Chalmers Model HD 10W Diesel Tractor with new Baker Hydraulic Bulldozer. Also extra track and parts.

R. Maturi & Company
Telephone 593
Chisholm, Minnesota

SHOVEL PARTS FOR SALE
for
Marion 392 Shovels
Marion 480 and 481 Shovels
(electrical parts only)
Bucyrus-Erie 10-B
Evergreen Mines Company
Crosby, Minn.

FOR SALE

Plymouth and Milwaukee gas locomotives, 8, 12, 25, 35 tons, 36" and std. ga., A-1.
Davenport, Porter, Vulcan 18 to 20-ton steam 36" gauge S/T locomotives (4), rebuilt.
Vulcan 18-ton steam S/T locomotive, 42" ga.
Porter 52-ton steam S/T locomotives, std. ga.
Bucyrus 50B and 80B steam shovels.
Page No. 411 Diesel 2-yd. dragline, 65' boom.
Monighan 3-yd. electric Walking dragline.
Gyratory crushers, 12", 21", 27"; 7" Newhouse.
Pioneer 300W portable gravel washing plant.
Buckeye trench excavators, Models 224 and 203.
Bucyrus-Erie 1¼-yd. gas-air shovel-cranes.
Bucyrus-Erie 4-yd. electric shovel, 120B.
Euclid 6-yd. bottom dump crawler wagons (8).
Hydroelectric plant, 1000 HP, 60' head, a.c.
Bucyrus-Erie 80' shovel boom, for 50B machine.
Boiler tubes, 236—1¾"x5', ferrules (new).

H. Y. SMITH CO.
828 N. Broadway **Milwaukee 2, Wis.**

Welding and Cutting Outfits, Torches, Regulators and Gauges, for heavy, medium and light welding and cutting. Superior Oxy-Acetylene Machine Co., Hamilton, Ohio.

FOR SALE
DRAGLINE BUCKET

1—1¼ cu. yd. Type AY Heavy Duty Dragline Bucket.

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee **Wisconsin**

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3 Million tons No. 7 strip coal available. Average 40' overburden, 5' coal. Truck and rail loading sites ideal.
Alex Kedas **Westville, Ill.**

SMALL SHOVELS, CRANES AND DRAGLINES UP TO 2½ YDS.

Several 50-B steam shovels, 1½ yard dipper, good condition, location Middle West. Box 3072

FOR SALE

Marion Type 471 Shovel-Dragline No. 6876, with 25'6" boom, 16'9" handle, 1¾ cu. yd. cast front manganese dipper; 33" wide treads; power boom hoist; electric lights; powered with Waukesha 7x7 engine driving a generator set. The machine is an oil-electric with General Electric hoist, swing and crowd motors. Dragline equipment consists of 65' boom, fairlead, high gantry, lagging, extra ballast (11600 lbs.) and Bucyrus-Erie 1¾ yd. "AY" dragbucket with cast wearing shoes. Box 3076

Marion Model 37 Electric Shovel for operation on 440 volts, 3 phase, 60 cycle AC; 1¾ yard capacity; located Indiana. Box 3071

FOR SALE
(Shovels, Draglines)

Northwest Shovel—Model 5, 1¼ cu. yds.
Gasoline Draglines combination, Bucyrus-Erie, shovel, model GA-3, 1 cu. yd. gasoline.
Osgood Shovel, model JMS Conquerer, 1 cu. yd. gasoline. Marion Shovel, model 7, 1 cu. yd. gasoline.
Northwest Shovel, model 105, 1 cu. yd. gasoline.
2 Lorain Shovels, model L-55, 1 cu. yd. gasoline.

These machines are in good condition. We sell at 55% of new price or less. Write
Box 491 Equity **113 W. 42nd St., N. Y. 18**

FOR SALE

One Model 41-B Bucyrus steam shovel, shop No. 5030, mounted on standard caterpillar type traction and equipped with 21' boom, 15' handle, 1¼ cu. yd. dipper. Box 3067

FOR SALE

Bucyrus-Erie 43-B 1¾ yard gasoline powered shovel located Minnesota. If interested inquire. Box 3075

LARGE SHOVELS, CRANES AND DRAGLINES 2½ YDS. AND UP

FOR SALE

One Model 78-C Standard Railroad Shovel with 3½ cu. yd. dipper, condition excellent. Box 3074

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1 Bucyrus-Erie 120-B and 1 Marion 4160, both 4 yd. electric, 2200 volts, 3 phase, 60 cycle, Ward Leonard control equipment, excellent condition, priced reasonable.
A. J. O'NEILL, Lansdowne Theatre Bldg., Lansdowne, Pa. — Phila. Phone: Madison 8300.

FOR SALE

Used 50-B steam shovel; 80-B steam dragline; Class 14 steam dragline; all Caterpillar mounted and now operating. Box 3052

HELP WANTED

WANTED

Trench hoe—not smaller than ½-yd. or larger than ¾-yd. Must be late model in good mechanical condition.

JOHN SCHLISE
327 N. Court St., Sturgeon Bay, Wis.

WANTED

Bulldozer for International T20 tractor. Also trailers large and small. Describe equipment—location—price.

GEORGE RIEMER
2900 Armitage Ave., Chicago 47, Illinois

WANTED

INDUSTRIAL SAND PLANT SUPT. Give birth date, schooling, experience, salary expected. Box No. 9235

WANTED

MAINTENANCE MAN. Steady Work. Good postwar opportunities. Write full experience with engines, motors, diesels, shovels, tractors, etc. to Box No. 9234.

WANTED

One main clutch housing with shaft and main gear for Universal truck crane—4 cylinder Waukesha motor. Write Sam Uram, P.O. Box 182, East Point, Ga.

WANTED

Dragline attachment suitable for Type GA-2 shovel shop No. 3675, must be complete including 40 or 45' boom, forward drum and gearing, fairlead and control mechanism but not including cable.

TOM B. CLEAGE
306 Ewing Avenue
Kansas City, Missouri

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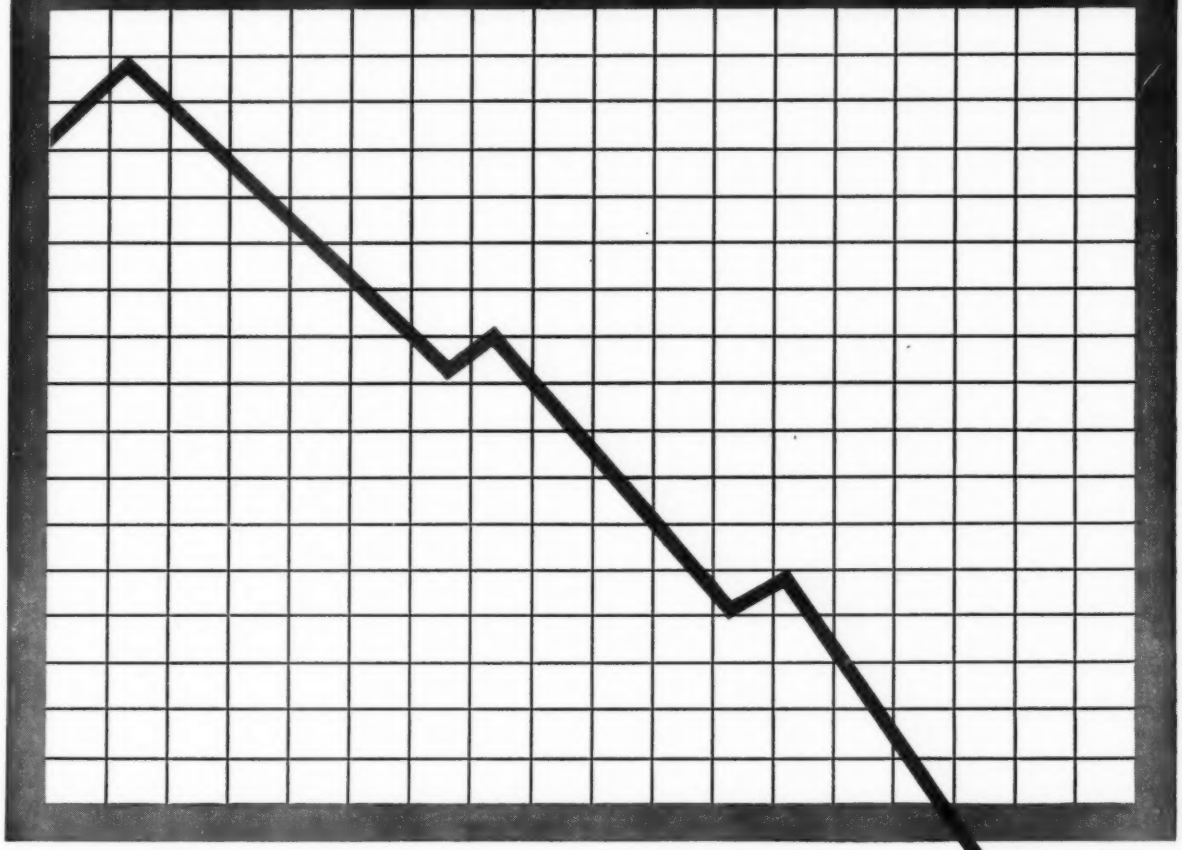

JOE MUST HAVE SWITCHED TO *TRU·LAY PREFORMED WIRE ROPE!!*

(Yes—it's safer to handle)

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ESSENTIAL PRODUCTS...TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, MANLEY Auto Service Equipment, MARYLAND Bolts and Nuts, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Steel Castings, WRIGHT Hoists, Cranes . . . *In Business for Your Safety*

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Primacord consists of a continuous core of PETN within a flexible textile cover. Primacord is insensitive to fire, friction or ordinary shock, but must be detonated by means of a fuse and cap or electric blasting cap. This detonating wave moves at the rate of 20,350 feet per *second* — practically instantaneously. It acts directly upon every cartridge in the hole, giving to each the added force of a primer cartridge.

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